Reshaping the Economy? Local Reallocation Effects of Place-Based Policies

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Today's Talk

- **Question:** Do **place-based policies** have significant aggregate **productivity impacts** on invested areas? If so, what is the **mechanism** driving effects?

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- **Context:** EU Cohesion Policy in **Italy**

- **What we do**
  1. Novel identification strategy utilizing **measurement error in regional GDP**
  2. Show **negative aggregate effects** of cohesion funds on **productivity growth and unemployment rates**
  3. Firm-level event studies reveal **mechanisms**

What We Know

1. Aggregate Effects of EU Cohesion Policy (using RD):
   - Positive GDP per capita growth BUT not long lived (Becker et al. 2010; Pellegrini et al. 2013; Becker et al. 2018; Barone et al. 2016)

What We Know

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2. Declining productivity growth (Adler et al. 2017; Fernald et al. 2025)
   - Declining business dynamism as driver (Decker et al. 2017)

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   → **Identify place-based policies as source of ↓ allocative efficiency**

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3. Effects of country-specific regional policies

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3. Effects of country-specific regional policies intended to incentivize hiring:

   - Positive employment, Null/noisy productivity/wage effects (Cerqua and Pellegrini 2014; Criscuolo et al. 2019; Ku et al. 2020; Siegloch et al. 2025; Grunau et al. 2024)

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4. Effects of place-based policies in Italy
   - Other programs have some positive effects, particularly employment (Cerqua and Pellegrini 2014; Barone et al. 2016; Incoronato and Lattanzio 2024)

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4. Effects of place-based policies in Italy
   - Cohesion policy:
     1. Descriptive null productivity effects (Albanese et al. 2021)
     2. Positive employment effects (spatial RD) (Giua 2017; Cerqua and Pellegrini 2022)

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4. Effects of place-based policies in Italy

   → **Novel aggregate identification strategy (not estimating LATE) + firm-level event studies**

Outline

Outline

The Big Picture

- **Cohesion Policy is one of the World's largest place-based policies**
- **Cohesion Policy is extremely broad in scope**
- **Basic implementation**

The Big Picture

- **Cohesion Policy is one of the World's largest place-based policies**
  - **€530 billion** total (2014-2020 period)
  - **€32.5 billion** for all 20 Italian regions
  - **€17.4 billion** of that was for only **5** of those regions: Calabria, Campania, Puglia, Sicily, and Basilicata
- **Cohesion Policy is extremely broad in scope**
- **Basic implementation**

The Big Picture

- **Cohesion Policy is one of the World's largest place-based policies**
- **Cohesion Policy is extremely broad in scope**
  - Infrastructure, R&D, business support, labor market programs...and more
  - Money to individuals, researchers, companies, NGOs, municipalities
  - Leads to many potential mechanisms/competing effects
- **Basic implementation**

The Big Picture

- **Cohesion Policy is one of the World's largest place-based policies**
- **Cohesion Policy is extremely broad in scope**
- **Basic implementation**
  - Funding periods of **7 years**
  - 2 Structural Funds: **ERDF** (invests in things), **ESF** (invests in people)
  - Managing authority: **mainly regional government** (+national)

Complex Institutional Details Distilled (2014 Round)

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2. Based on three-year avg. of regional GDP/capita:
    1. $\leqslant$ **75%** EU average: "less developed"
    2. **75-90%**: "transition"
    3. $\geqslant$ **90%**: "more developed" ▸ 2007 Period

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    3. $\geqslant$ **90%**: "more developed" ▸ 2007 Period
3. Conditional on type, **different funding formulas** used ▸ Details
    - Transition regions receive at most 40% of what they would as a less developed. More developed get very little.
    - **There is also an "intensive margin" in the formulas**

Data

- Funding data (OpenCoesione): Sumstats
  Universe of geo-referenced projects co-financed by any EU fund in Italy
  - Funding periods 2007-2013 and 2014-2020
  - Funding commitments/payments, project dates, municipality, etc.
  - VAT tax identifier of project actors
- Data on firm productivity, entry and exit:
  "Historical" ORBIS data (Bureau van Dijk)
  - Company information, industry code, financials (balance sheets) Coverage
  - "Historical" because exiting firms are kept in data
- Historical and revised GDP data

Outline

Identification: Counterfactual shocks

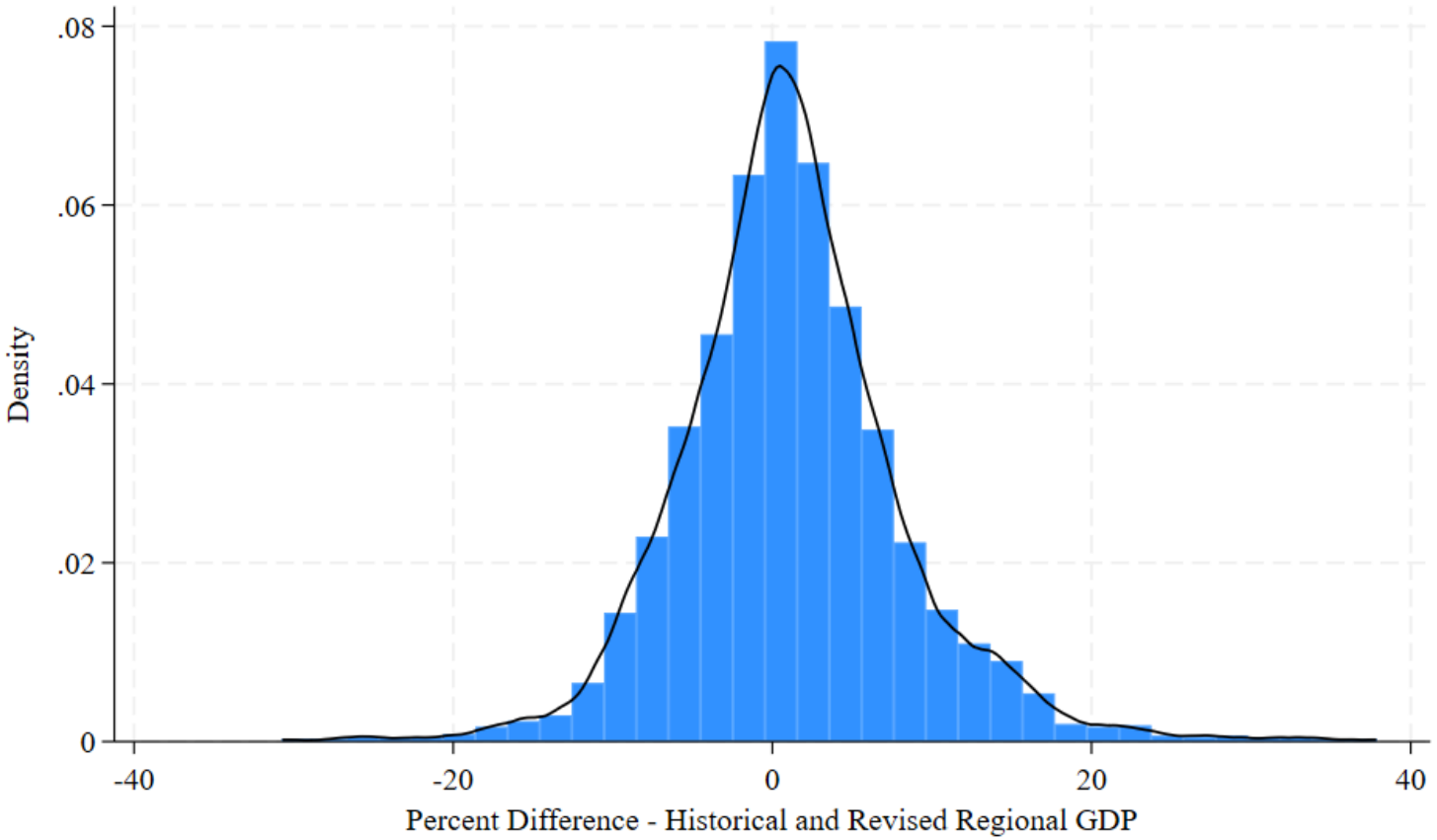
"Nonrandom Exposure to Exogenous Shocks" Borusyak and Hull (2023)

- Obvious Issue: Funding is endogenous
- Intuition: Observe the realization of funding, but *could have been different*
  - Observe a single treatment combining endogenous and exogenous variation
  - **Controlling for the "expected" shock** purges the endogenous portion
- In Practice: Construct counterfactual (CF) shocks many times, average them, and use as a control function or IV
  - Must have a formula for the treatment (funding formulas!)
  - Exogenous: **Measurement error (ME)** in regional GDPs
  - Endogenous: Industry composition of CZ, Demand for funding, etc.

Identification: Counterfactual shocks

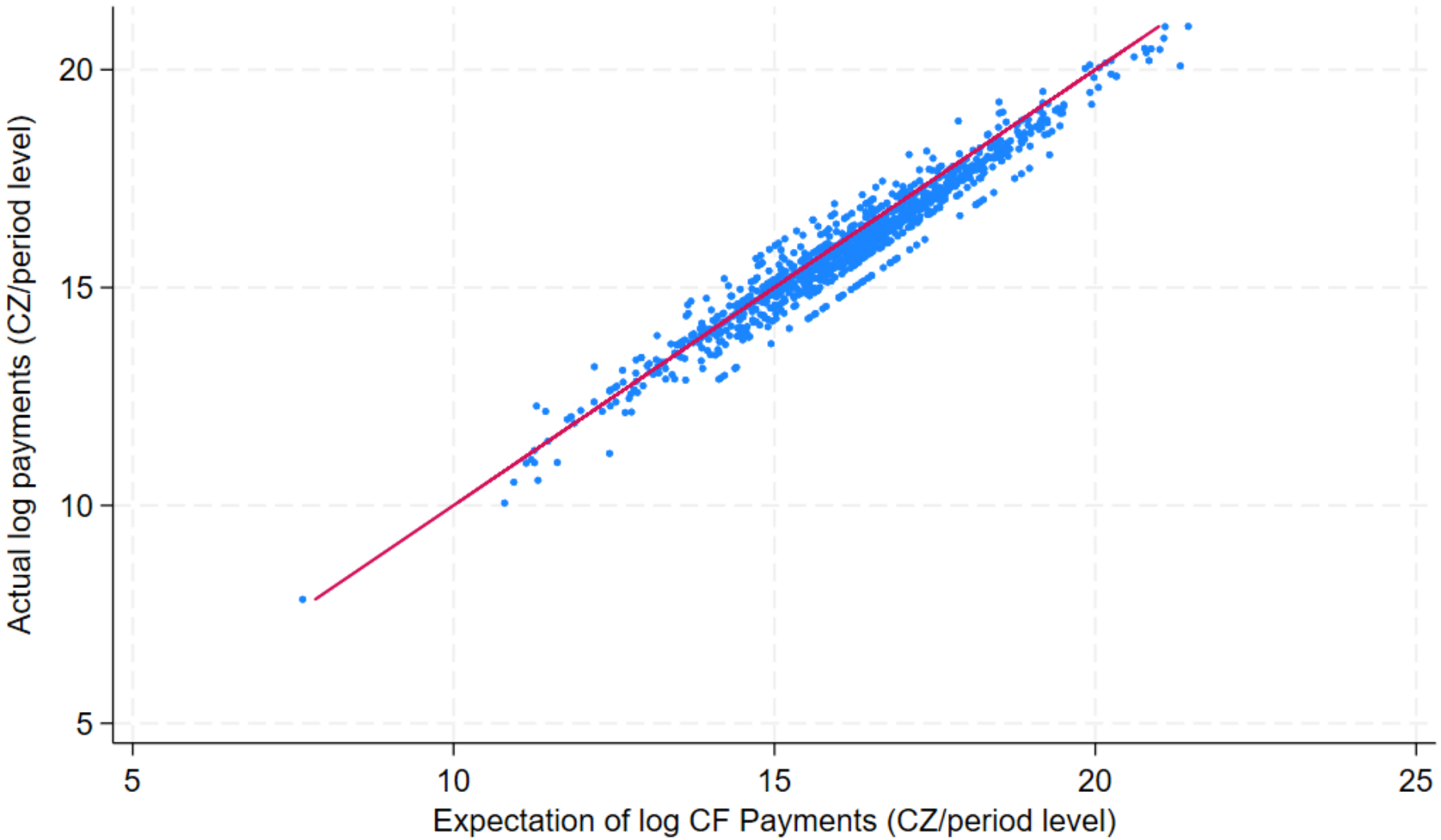
- For Example: Let's say ...
  - Sicily and Campania have the same true GDP/capita - €18,000. EU average is €24,000 → both at 75% EU average
  - Two CZs in Sicily and Campania have the exact same demand for cohesion funding and industry composition (same exposure)
  - Sicily has a "good" measurement error shock, Campania a "bad" one → Sicily classified as "less developed", Campania "transition"
  - CZ in Sicily (Campania) receives more (less) funding than expected – due to measurement error
- Thresholds + intensive margin are relative → funding depends on **every other EU region's shock**

Measurement Error can be Huge



▸ Per Capita

Actual vs. Expected Funding



Conceptual Issues with CF Construction

- Funding level in a commuting zone may be written as:

$$\begin{aligned} Funds_{ct} &= s_{ct} \cdot Funds_{rt} \\ &= s_{ct} \cdot g(GDP_{rt}, GDP_{-rt}, ME_{rt}, ME_{-rt}) \end{aligned}$$

  s_{ct} is the share of region r's funds which are used in CZ c

- **Identification hinges on finding an exogenous source of variation**
  1. GDP estimates are done by people year-after-year → **likely serial autocorrelation** in ME_{rt} ▸ Go
  2. Potential relationship of measurement error and other economic characteristics ▸ Exogeneity ▸ 3-year Average ▸ Simulations

Identification: Our Case

Funding in a commuting zone c during the funding period t

$$y_{ct} = \beta_0 + \beta_1 \log(Funds)_{ct} + \beta_2 \log(E[Funds])_{ct} + \beta_3 x_{ct} + \eta_t + \epsilon_{ct} \quad (1)$$

- y_{ct}: Δ Commuting zone value added/worker and decomposed components over the funding period
- $Funds_{ct}$: actual per capita funding during the period
- $E[Funds]_{ct}$: averaged CF per capita funding during the period
- x_{ct}: control variables (initial year)
- All regressions weighted by start-of-period population share. Standard errors clustered at regional level

Decomposing Productivity Changes

Follow the Melitz and Polanec (2015) decomposition of changes in regional productivity $\Delta\Phi$ into contributions from:

1. Symmetric - $\Delta\bar{\phi}$
2. Labor reallocation among incumbents - Δcov
3. Entry of new establishments
4. Exit of incumbent establishments

Outline

Negative Labor Reallocation, Positive Entry Effects

Table: Decomposition of Aggregate Productivity Growth Effects

	(1) $\Delta\Phi$	(2) $\Delta\overline{\phi}$	(3) Δcov	(4) Entry	(5) Exit
Log(Payments)	-0.0290	0.0107	-0.0636***	0.0321**	-0.00830
	(0.0210)	(0.0152)	(0.0174)	(0.0116)	(0.00815)
Log(E(Payments))	0.0414	0.000150	0.0694***	-0.0341**	0.00590
	(0.0297)	(0.0177)	(0.0215)	(0.0136)	(0.00883)
Observations	1040	1040	1040	1040	1040

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

▸ Aggregate ▸ Complex CF

Robustness Checks and Heterogeneity

1. **Industry Heterogeneity**
   - Negative labor reallocation effects are driven by ▸ Manufacturing
   - Positive entry effects driven by ▸ Construction and ▸ Services
2. **Total Factor Productivity:** Similar ▸ TFP
3. **Alternative Sample Compositions/Controls:** ▸ Go
4. **Split by Funding Period:** Entry possibly driven by 2014-2020 ▸ Go
5. **Alternative Time Span:** Similar ▸ Go
6. **Absolute Funding Levels:** Similar ▸ Go

Potential Mechanisms: High productivity firms growing less

Negative labor reallocation could be due to:

1. Low productivity firms growing more
2. High productivity firms growing less (or shrinking)

Table: URate Response to EU Cohesion Policy

	(1) $\Delta URate$	(2) $\Delta URate$	(3) $\Delta URate$	(4) $\Delta URate$	(5) $\Delta URate$
Log(Payments)	1.005**	1.317**	0.840	0.912*	0.880
	(0.478)	(0.470)	(0.534)	(0.471)	(0.537)
Log(E(Payments))	-0.665	-1.221*	-0.722	-0.949	-0.734
	(0.563)	(0.652)	(0.654)	(0.601)	(0.712)
Payments x MoreDev					-0.328***
					(0.113)
Observations	1040	1040	1040	1040	1040
Demo. Controls	No	No	Yes	Yes	Yes
Other EU Payments Controls	No	Yes	No	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

▸ LFPR

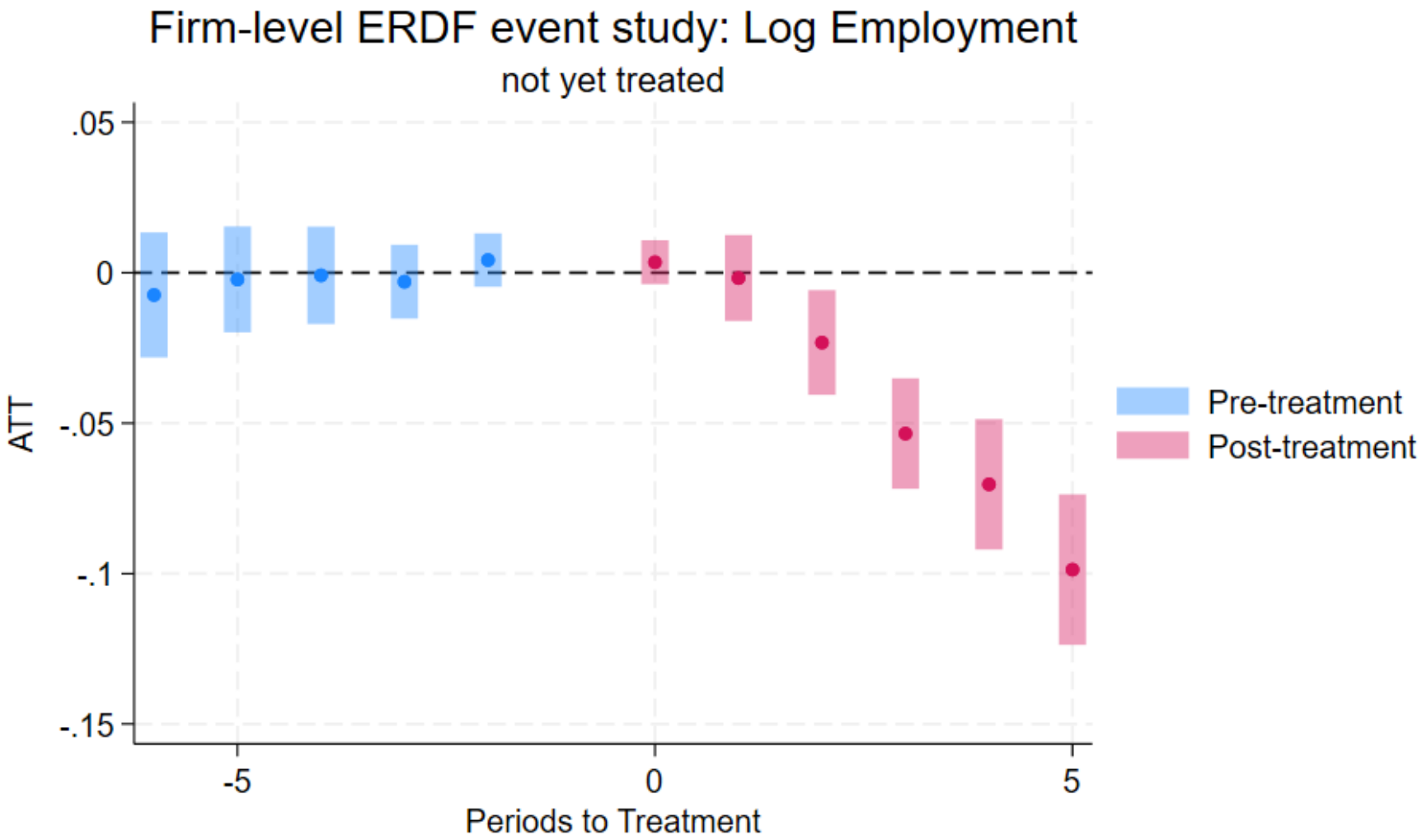
Mechanism Analysis: Firm-Level

- We have VAT tax identifiers in the subsidy data $\rightarrow$ identify specific firms in Orbis which received funds
- Run event studies around start of a project

$$Y_{it} = \alpha_i + \delta_t + \sum_{\substack{i=-k \\ i \neq -1}}^{k} \gamma_i \cdot 1(t = \text{Year Treatment}_c + i) + \kappa_j + \zeta_r + \epsilon_{it} \quad (2)$$

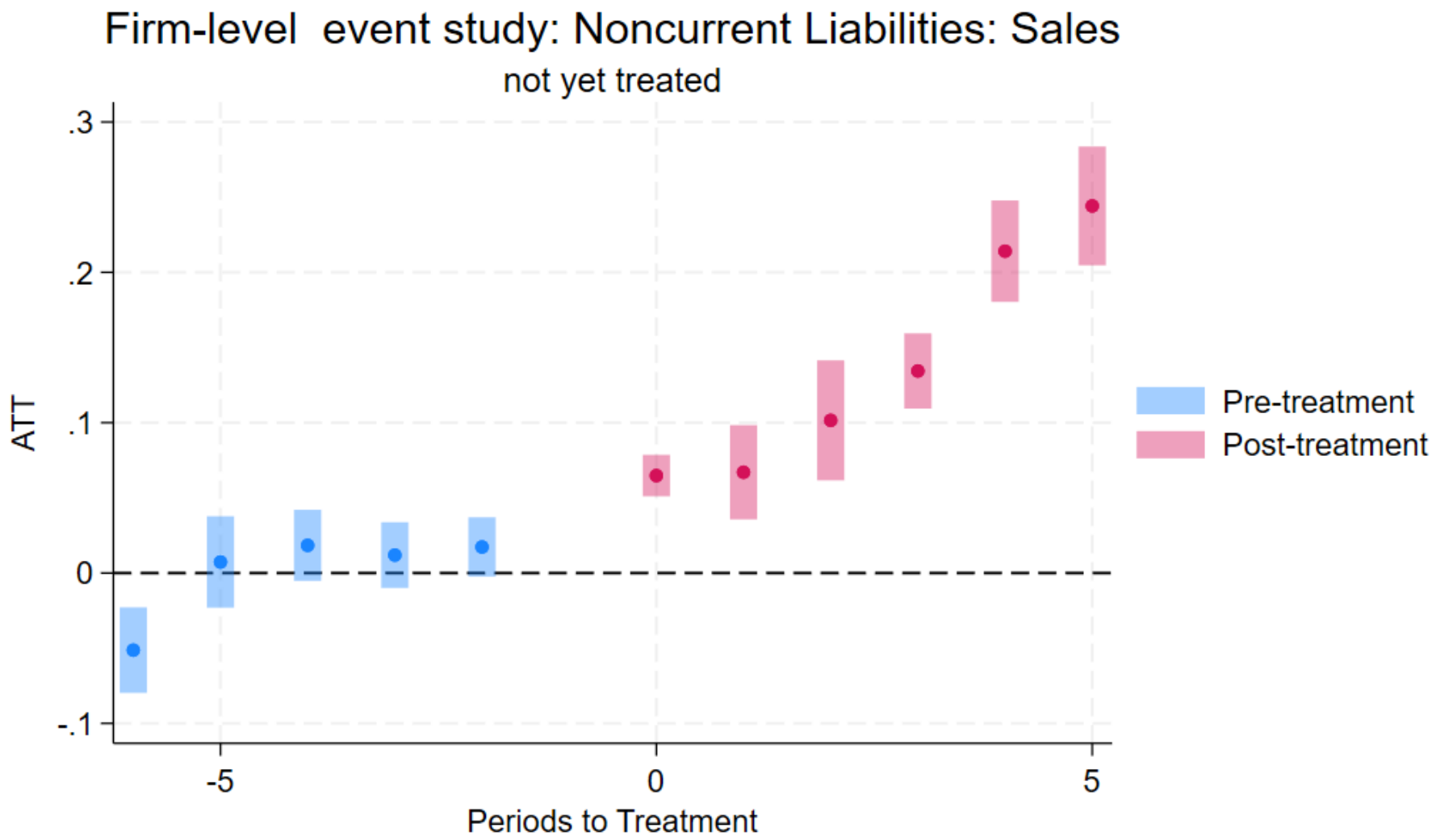
- κ_j are industry FE (2-digit NACE), ζ_r are region FE
- Using Callaway and Sant'Anna (2021) estimator, **control group is yet-to-be-treated firms**

Large Employment ↓



▸ No Controls ▸ Never Treated ▸ ESF ▸ Productivity

Liquidity Constraints ↑



▸ ESF

Outline

Conclusion

- We study policy-induced productivity changes from EU Cohesion Policy using a novel identification strategy exploiting measurement error in regional GDPs
- Find negative productivity effects driven by labor reallocation to less productive firms + increased unemployment
- Firm-level mechanism analysis suggest that the funds induce firms to reduce employment + increased liquidity constraints
- Bad for workers in the medium term, very long-term effects remain ambiguous

Thank you!

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Outline

Orbis coverage

- Follow data cleaning procedures of Kalemli-Ozcan et al. (2015)
- Bureau van Dijk obtains information on Italian firms from the government

  $\rightarrow$ Coverage is better, if required to register will eventually appear in our data
- We compare coverage of Orbis aggregate data:
  - "Scraped" data (firms, 2023 cross section)
  - MovImprese (firms, Italian Chamber of Commerce)
  - ASIA (establishments, ISTAT)

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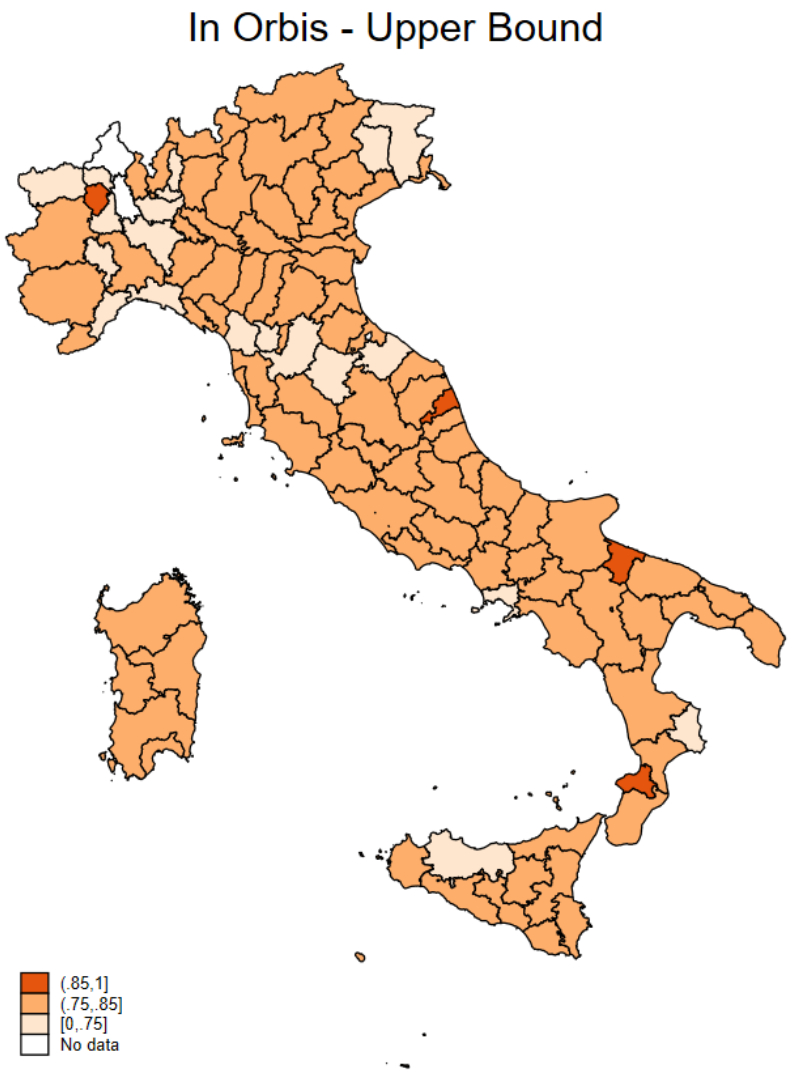
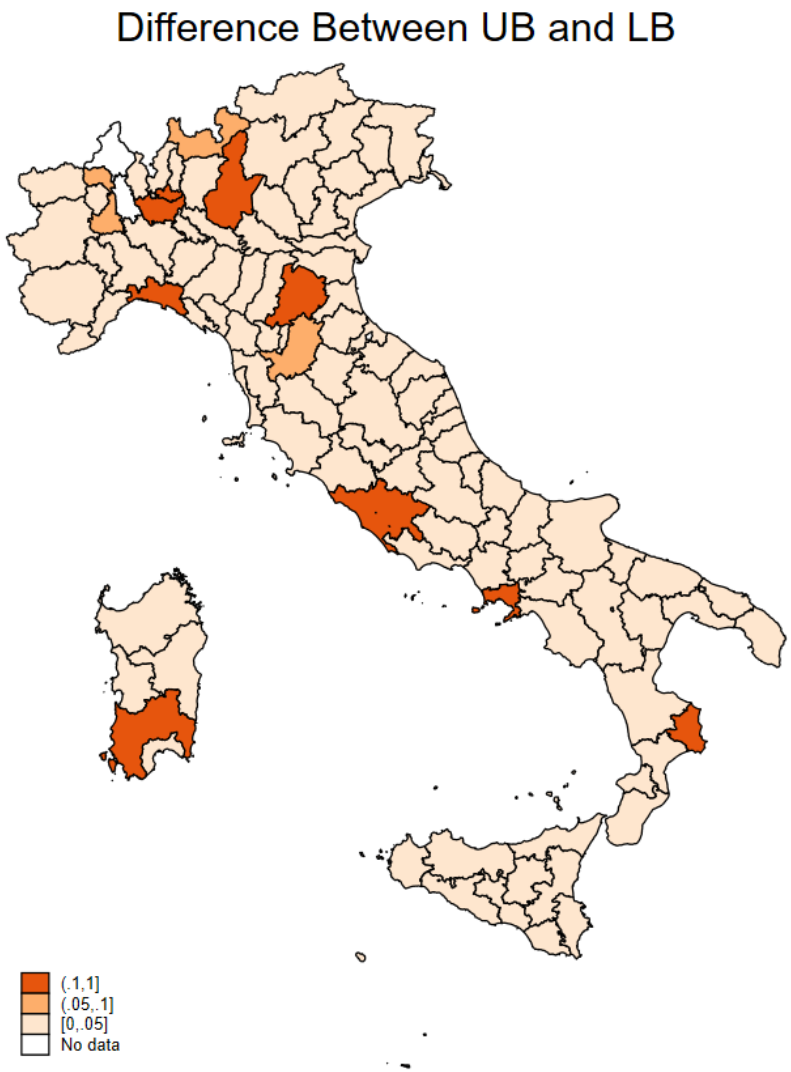
"Scraped" Data - 75-85%





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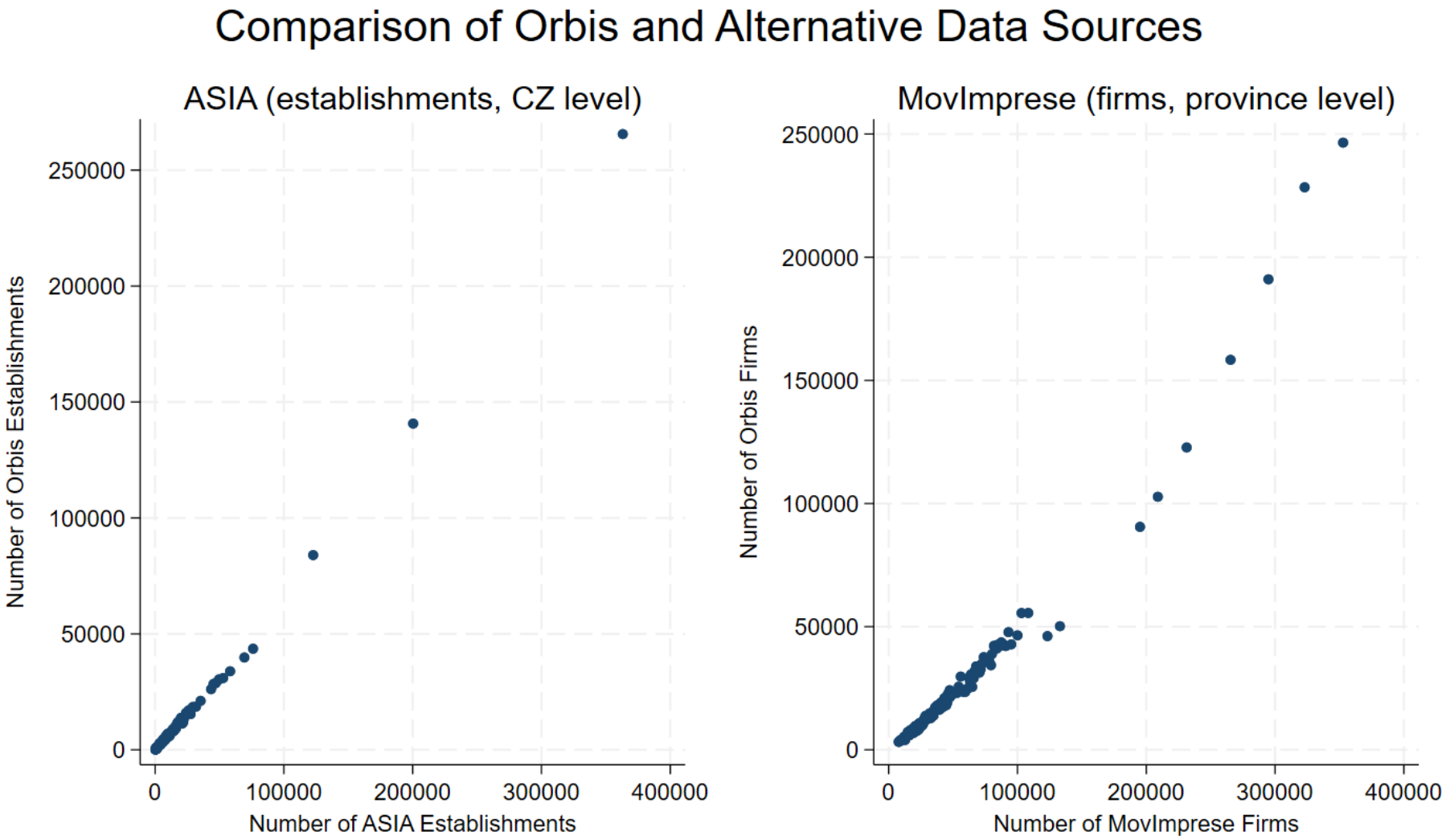
ASIA + MovImprese



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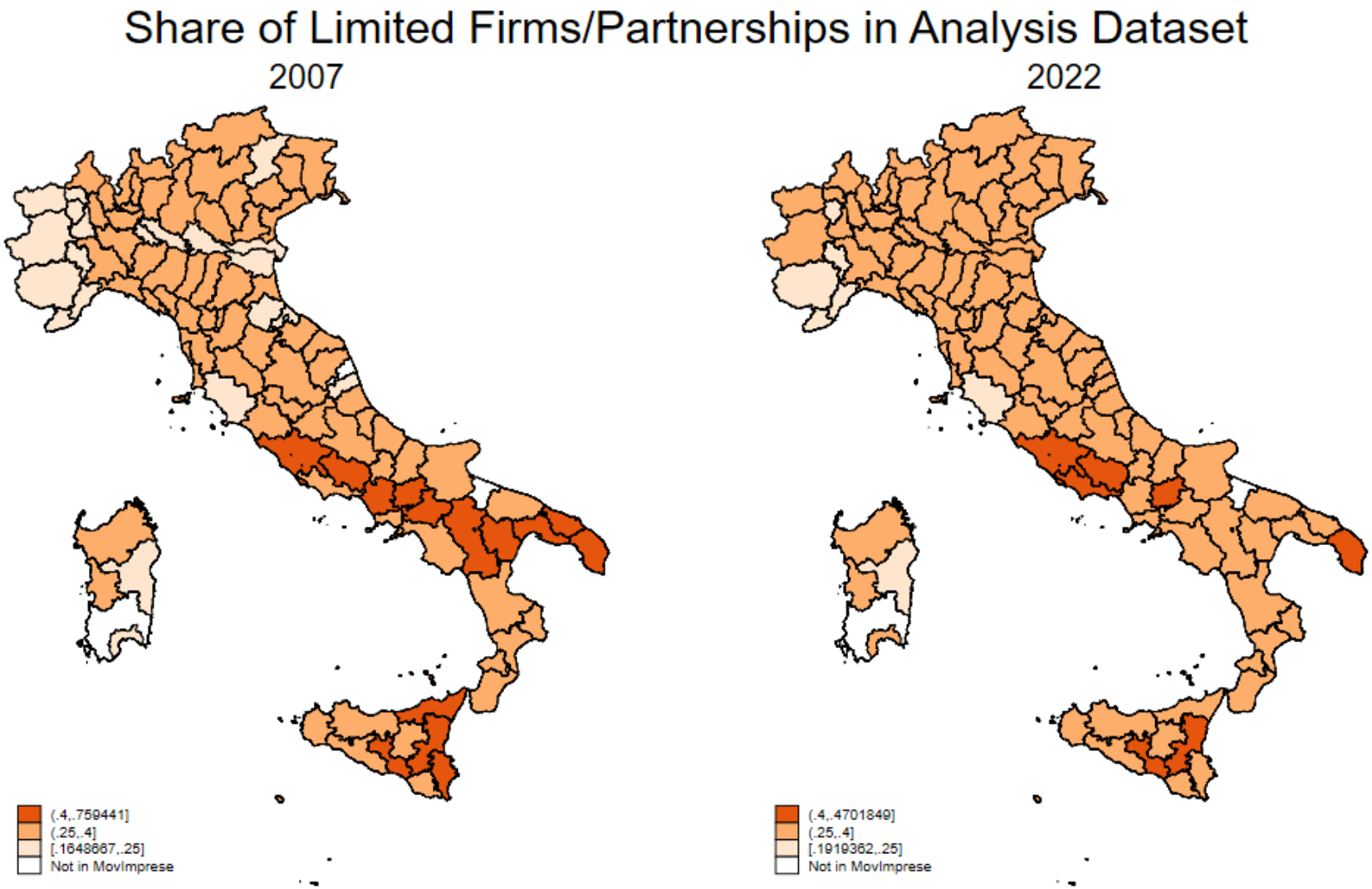
Analysis Sample



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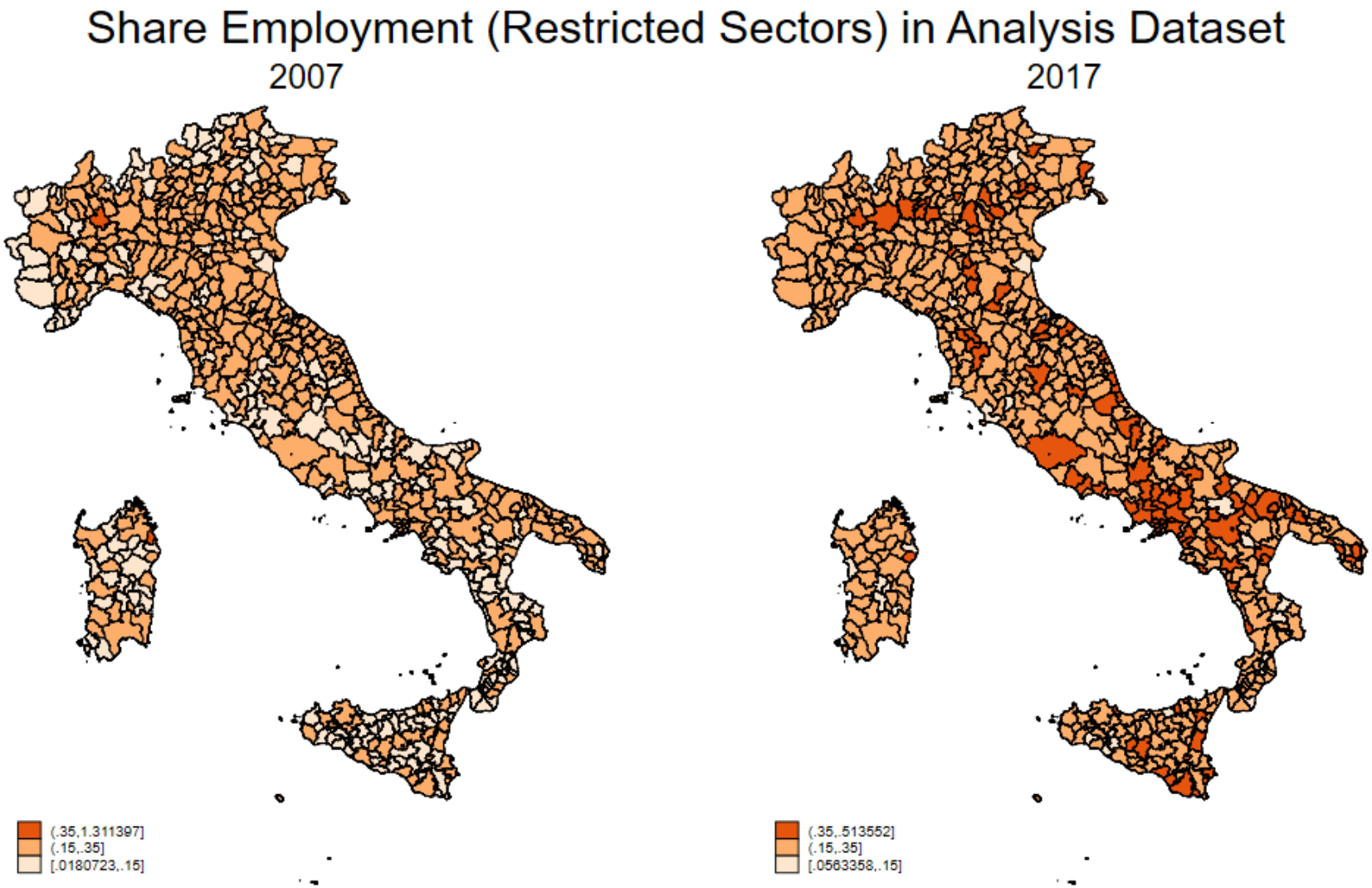

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Sumstats

	Funding Period					
	2007-2013			2014-2020		
	Classification of Eligibility			Classification of Eligibility		
	Less Developed	More Developed	Transition	Less Developed	More Developed	Transition
N. projects/1000 persons	4	8	13	3	6	9
Mean Funding commitments/project	195815	37897	101042	193395	37686	41086
Total Funding commitments/cap	851	298	1308	657	244	353
Mean payments/project	154267	35394	89227	115876	33027	28538
Total payments/cap	671	279	1155	394	214	245
Mean Duration (Days)	393	151	412	332	276	440

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Sumstats - Project Theme

	Funding Period					
	2007-2013			2014-2020		
	Classification of Eligibility			Classification of Eligibility		
	Less Developed	More Developed	Transition	Less Developed	More Developed	Transition
EU Theme (% of projects)						
Research & Innovation	1.66	3.30	0.91	1.53	3.55	2.77
Digital Networks & Services	2.53	1.32	3.74	1.06	1.02	1.33
Business Competitiveness	12.15	3.71	4.26	47.37	14.04	13.01
Energy	1.25	1.54	2.48	1.33	0.44	1.44
Environment	4.55	0.51	2.44	3.09	0.16	0.48
Culture & Tourism	3.61	0.64	3.68	1.89	0.21	0.66
Transportation	0.84	0.19	0.30	0.55	0.10	0.05
Employment & Work	22.52	71.71	40.09	23.47	64.94	60.97
Social Inclusion & Health	6.12	3.64	6.64	5.04	5.78	9.95
Education & Training	44.25	12.59	31.64	14.20	9.03	9.03
Administrative Capacity	0.52	0.85	3.83	0.46	0.73	0.30
EU Theme (% of payments)						
Research & Innovation	3.57	16.12	2.95	7.06	11.78	12.33
Digital Networks & Services	2.62	2.15	10.73	1.98	2.28	3.68
Business Competitiveness	10.35	7.07	11.37	16.82	16.46	12.32
Energy	2.14	5.78	5.89	3.83	3.18	12.61
Environment	12.21	4.11	8.27	20.76	1.93	8.22
Culture & Tourism	7.66	5.37	7.64	4.52	1.51	7.20
Transportation	16.91	5.00	10.34	13.94	1.47	2.38
Employment & Work	10.81	32.23	13.27	6.59	22.42	20.52
Social Inclusion & Health	13.40	5.11	11.38	8.80	19.47	15.14
Education & Training	18.80	13.67	11.59	11.70	15.63	4.10
Administrative Capacity	1.52	3.37	6.59	4.00	3.86	1.50

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Sumstats - Project Actors

	Funding Period					
	2007-2013			2014-2020		
	Classification of Eligibility			Classification of Eligibility		
	Less Developed	More Developed	Transition	Less Developed	More Developed	Transition
Share of Projects						
Government	0.23	0.20	0.52	0.44	0.41	0.43
Firm	0.15	0.52	0.24	0.41	0.56	0.29
Individuals	0.16	0.11	0.14	0.22	0.07	0.29
Other	0.56	0.25	0.18	0.16	0.22	0.05
Share of Payments						
Government	0.45	0.37	0.59	0.58	0.40	0.47
Firm	0.29	0.44	0.36	0.51	0.46	0.41
Individuals	0.02	0.08	0.03	0.18	0.03	0.05
Other	0.31	0.22	0.13	0.26	0.23	0.13

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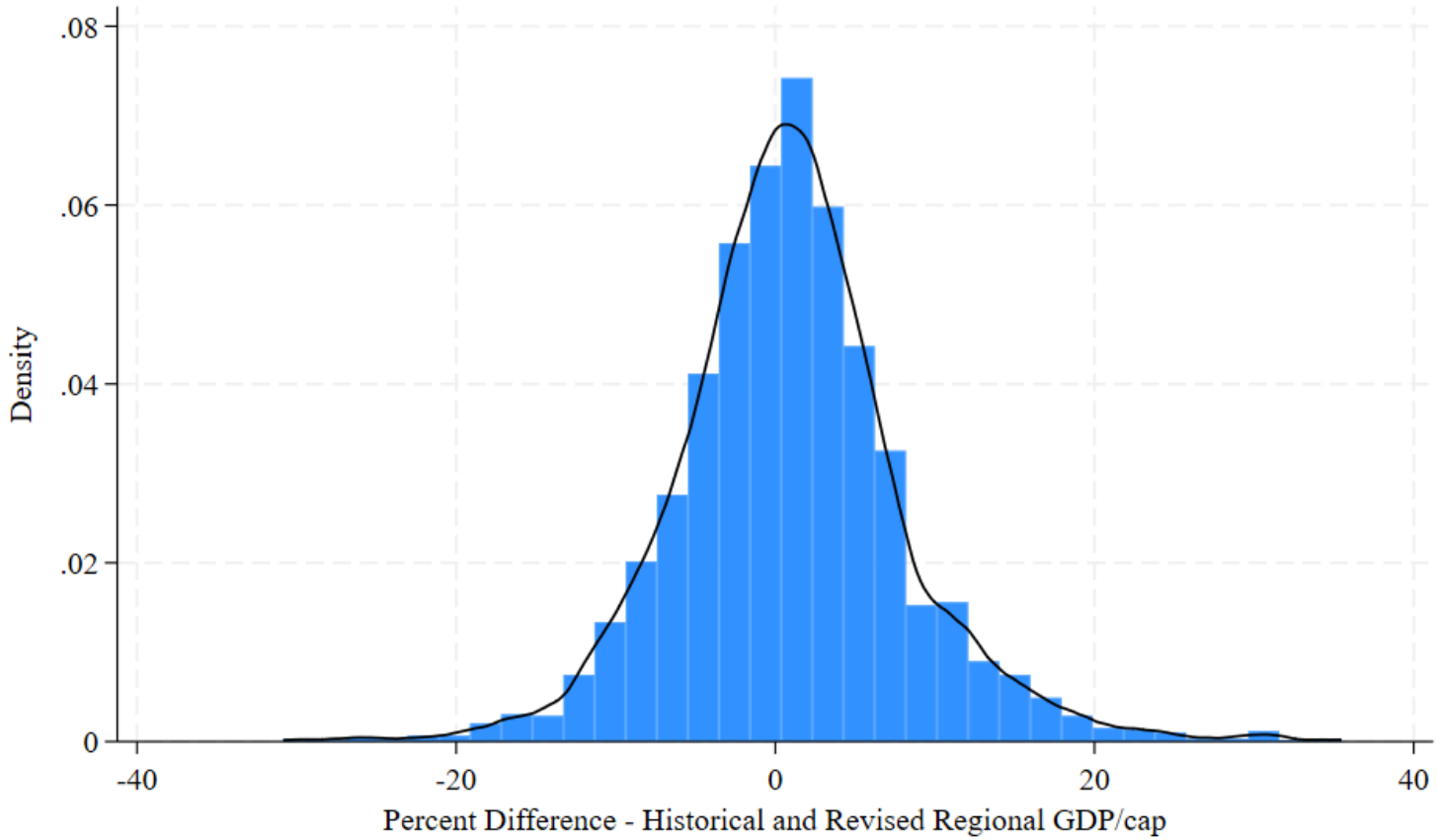
Per Capita error can also be huge



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2007 Rules for Eligibility

1. **Less developed regions** are those with a GDP per capita less than 75% of the EU-25 average GDP per capita
2. **Phasing out regions** are those that would have been less developed regions if the EU Eastern Enlargement of 2004 hadn't happened. More precisely, if the region is below the 75th percentile cutoff of the EU-15, it remained eligible for phasing out funding.
3. **Phasing in regions** are those that were less developed regions during the final year of the 2000-2006 funding period, but their GDP was now above the 75% threshold.
4. **More developed regions** are all other regions

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Details on the Funding Formulas

Allocation method for the regions eligible under the Convergence objective referred to in Article 5(1)

1. Each Member State's allocation is the sum of the allocations for its individual eligible regions, which are calculated on the basis of relative regional and national prosperity and the unemployment rate according to the following steps:

   (a) determination of an absolute amount (in euro) obtained by multiplying the population of the region concerned by the difference between that region's GDP per capita, measured in purchasing power parities, and the EU-25 average GDP per capita;

   (b) application of a percentage to the above absolute amount in order to determine that region's financial envelope; this percentage is graduated to reflect the relative prosperity, as compared to the EU-25 average, of the Member State in which the eligible region is situated, i.e.:

   — for regions in Member States whose level of GNI per capita is below 82 % of the Community average: 4,25 %

   — for regions in Member States whose level of GNI per capita is between 82 % and 99 % of the Community average: 3,36 %

   — for regions in Member States whose level of GNI per capita is over 99 % of the Community average: 2,67 %;

   (c) to the amount obtained under step (b) is added, if applicable, an amount resulting from the allocation of a premium of EUR 700 per unemployed person, applied to the number of persons unemployed in that region exceeding the number that would be unemployed if the average unemployment rate of all the EU convergence regions applied.

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Details on the Funding Formulas

Allocation method for the Member States and regions eligible for the transitional support referred to in Article 8

6. The allocations under the transitional support referred to in Article 8 will result from the application of the following parameters:

(a) for the regions defined in Article 8(1), 80 % of their individual 2006 per capita aid intensity level in 2007 and a linear reduction thereafter to reach the national average per capita aid intensity level for the Regional competitiveness and employment objective in 2013. To the allocation thus obtained is added, if applicable, an amount resulting from the allocation of a premium of EUR 600 per unemployed person, applied to the number of persons unemployed in that region exceeding the number that would be unemployed if the average unemployment rate of all the EU convergence regions applied.

(b) for the regions defined in Article 8(2), 75 % of their individual 2006 per capita aid intensity level in 2007 and a linear reduction thereafter to reach the national average per capita aid intensity level for the Regional competitiveness and employment objective by 2011. To the allocation thus obtained is added, if applicable, an amount resulting from the allocation of a premium of EUR 600 per unemployed person, applied to the number of persons unemployed in that region exceeding the number that would be unemployed if the average unemployment rate of all the EU convergence regions applied;

(c) for the Member States defined in Article 8(3), the allocation will be degressive over seven years, with the amount in 2007 being EUR 1,2 billion, in 2008 EUR 850 million, in 2009 EUR 500 million, in 2010 EUR 250 million, in 2011 EUR 200 million, in 2012 EUR 150 million and in 2013 EUR 100 million.

Details on the Funding Formulas

Allocation method for the Member States and regions eligible under the Regional competitiveness and employment objective referred to in Article 6

4. The share of each Member State concerned is the sum of the shares of its eligible regions, which are determined on the basis of the following criteria, weighted as indicated: total population (weighting 0,5), number of unemployed people in NUTS level 3 regions with an unemployment rate above the group average (weighting 0,2), number of jobs needed to reach an employment rate of 70 % (weighting 0,15), number of employed people with a low educational level (weighting 0,10), and low population density (weighting 0,05). The shares are then adjusted according to relative regional prosperity (for each region, increase or decrease of its total share by + 5 %/-5 % according to whether its GDP per capita is below or above the average GDP per capita for the group). The share of each Member State will not however be less than three-quarters of its share in 2006 of combined funding under Objectives 2 and 3.

Details on the Funding Formulas

Allocation method for the less developed regions eligible under the Investment for growth and jobs goal, referred to in point (a) of the first subparagraph of Article 90(2)

1. Each Member State's allocation shall be the sum of the allocations for its individual eligible NUTS level 2 regions, calculated in accordance with the following steps:

   (a) determination of an absolute amount (in EUR) obtained by multiplying the population of the region concerned by the difference between that region's GDP per capita, measured in PPS, and the EU-27 average GDP per capita (in PPS);

   (b) application of a percentage to the above absolute amount in order to determine that region's financial envelope; this percentage shall be graduated to reflect the relative prosperity, measured in PPS, as compared to the EU-27 average, of the Member State in which the eligible region is situated, i.e.:

      (i) for regions in Member States whose level of GNI per capita is below 82 % of the EU-27 average: 3,15 %;

      (ii) for regions in Member States whose level of GNI per capita is between 82 % and 99 % of the EU-27 average: 2,70 %;

      (iii) for regions in Member States whose level of GNI per capita is over 99 % of the EU-27 average: 1,65 %;

   (c) to the amount obtained in accordance with point (b) is added, if applicable, an amount resulting from the allocation of a premium of EUR 1 300 per unemployed person per year, applied to the number of persons unemployed in that region exceeding the number that would be unemployed if the average unemployment rate of all the EU less developed regions applied.

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Details on the Funding Formulas

Allocation method for transition regions eligible under the Investment for growth and jobs goal, referred to in point (b) of the first subparagraph of Article 90(2)

2. Each Member State's allocation shall be the sum of the allocations for its individual eligible NUTS level 2 regions, calculated in accordance with the following steps:

(a) determination of the minimum and maximum theoretical aid intensity for each eligible transition region. The minimum level of support is determined by the average per capita aid intensity per Member State before the application of the regional safety net, allocated to the more developed regions of that Member State. If the Member State has no more developed regions, the minimum level of support will correspond to the initial average per capita aid intensity of all more developed regions, i.e. EUR 19,80 per head and per year. The maximum level of support refers to a theoretical region with a GDP per head of 75 % of the EU-27 average and is calculated using the method defined in points (a) and (b) of paragraph 1. Of the amount obtained by this method, 40 % is taken into account;

(b) calculation of initial regional allocations, taking into account regional GDP per capita (in PPS) through a linear interpolation of the region's relative GDP per capita compared to EU-27;

(c) to the amount obtained in accordance with point (b) is added, if applicable, an amount resulting from the allocation of a premium of EUR 1 100 per unemployed person per year, applied to the number of persons unemployed in that region exceeding the number that would be unemployed if the average unemployment rate of all the less developed regions applied.

Details on the Funding Formulas

Allocation method for the more developed regions eligible under the Investment for growth and jobs goal, referred to in point (c) of the first subparagraph of Article 90(2)

3. The total initial theoretical financial envelope shall be obtained by multiplying an aid intensity per head and per year of EUR 19,80 by the eligible population.

4. The share of each Member State concerned shall be the sum of the shares of its eligible NUTS level 2 regions, which are determined on the basis of the following criteria, weighted as indicated:

   (a) total regional population (weighting 25 %);

   (b) number of unemployed people in NUTS level 2 regions with an unemployment rate above the average of all more developed regions (weighting 20 %);

   (c) employment to be added to reach the Union strategy for smart, sustainable and inclusive growth target for regional employment rate (ages 20 to 64) of 75 % (weighting 20 %);

   (d) number of persons aged 30 to 34 with tertiary educational attainment to be added to reach the Union strategy for smart, sustainable and inclusive growth target of 40 % (weighting 12,5 %);

   (e) number of early leavers from education and training (aged 18 to 24) to be subtracted to reach the Union strategy for smart, sustainable and inclusive growth target of 10 % (weighting 12,5 %);

   (f) difference between the observed GDP of the region (measured in PPS), and the theoretical regional GDP if the region were to have the same GDP per head as the most prosperous NUTS level 2 region (weighting 7,5 %);

   (g) population of NUTS level 3 regions with a population density below 12,5 inhabitants/km^2 (weighting 2,5 %).

Counterfactual Funding Simulations

	Classification of Eligibility			
	More Developed	Transition	Less Developed	Total
NUTS2 Name				
Calabria		915.26	1563.61	1561.01
		(8.73)	(148.69)	(153.94)
Campania		736.61	1272.94	1095.41
		(26.77)	(119.63)	(271.23)
Emilia-Romagna	216.41			216.41
	(36.97)			(36.97)
Lazio	214.37			214.37
	(34.61)			(34.61)
Lombardia	211.74			211.74
	(30.53)			(30.53)
Piemonte	259.24			259.24
	(59.39)			(59.39)
Puglia		543.73	1207.42	1098.57
		(14.82)	(131.22)	(273.64)
Sicilia		705.32	1303.09	1223.58
		(23.86)	(125.35)	(234.39)
Toscana	280.22			280.22
	(56.83)			(56.83)
Veneto	257.03			257.03
	(57.79)			(57.79)
Total	239.84	681.10	1350.39	641.76
	(54.58)	(86.85)	(194.87)	(530.31)

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Counterfactuals - Eligibility (2007 period)

	Classification of Eligibility		
	More Developed	Transition	Less Developed
NUTS2 Name			
Abruzzo	978	22	
Basilicata		875	125
Calabria		4	996
Campania		331	669
Emilia-Romagna	1,000		
Friuli-Venezia Giulia	1,000		
Lazio	1,000		
Liguria	1,000		
Lombardia	1,000		
Marche	1,000		
Molise	690	280	30
Piemonte	1,000		
Provincia Autonoma Bolzano/Bozen	1,000		
Provincia Autonoma Trento	1,000		
Puglia		164	836
Sardegna		737	263
Sicilia		133	867
Toscana	1,000		
Umbria	1,000		
Valle d'Aosta/Vallée d'Aoste	1,000		
Veneto	1,000		

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Counterfactuals - Funding Level (2007 period)

	Classification of Eligibility			
	More Developed	Transition	Less Developed	Total
NUTS2 Name				
Abruzzo	313.06	311.47		313.03
Basilicata		1114.85	1101.17	1113.14
Calabria		915.26	1563.61	1561.01
Campania		736.61	1272.94	1095.41
Emilia-Romagna	216.41			216.41
Friuli-Venezia Giulia	269.50			269.50
Lazio	214.37			214.37
Liguria	286.77			286.77
Lombardia	211.74			211.74
Marche	310.91			310.91
Molise	314.09	552.40	1052.84	402.98
Piemonte	259.24			259.24
Provincia Autonoma Bolzano/Bozen	211.54			211.54
Provincia Autonoma Trento	212.55			212.55
Puglia		543.73	1207.42	1098.57
Sardegna		880.29	1161.81	954.33
Sicilia		705.32	1303.09	1223.58
Toscana	280.22			280.22
Umbria	311.22			311.22
Valle d'Aosta/Vallée d'Aoste	211.54			211.54
Veneto	257.03			257.03
Total	257.43	870.48	1326.71	524.53

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Counterfactuals - Eligibility

	Classification of Eligibility		
	More Developed	Transition	Less Developed
NUTS2 Name			
Abruzzo	613	385	2
Basilicata	9	799	192
Calabria		41	959
Campania		318	682
Emilia-Romagna	1,000		
Friuli-Venezia Giulia	999	1	
Lazio	1,000		
Liguria	1,000		
Lombardia	1,000		
Marche	983	17	
Molise	230	753	17
Piemonte	1,000		
Provincia Autonoma Bolzano/Bozen	1,000		
Provincia Autonoma Trento	1,000		
Puglia		72	928
Sardegna	21	847	132
Sicilia		216	784
Toscana	1,000		
Umbria	955	45	
Valle d'Aosta/Vallée d'Aoste	1,000		
Veneto	1,000		

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Counterfactuals - Expected Funding per Capita

	Classification of Eligibility			
	More Developed	Transition	Less Developed	Total
NUTS2 Name				
Abruzzo	172.54	199.41	698.60	183.94
Basilicata	173.88	264.93	799.41	366.73
Calabria		296.33	925.96	900.14
Campania		322.78	890.62	710.05
Emilia-Romagna	172.65			172.65
Friuli-Venezia Giulia	171.88	176.00		171.88
Lazio	172.86			172.86
Liguria	171.96			171.96
Lombardia	173.83			173.83
Marche	171.99	189.73		172.29
Molise	171.90	213.05	772.99	213.11
Piemonte	172.77			172.77
Provincia Autonoma Bolzano/Bozen	171.64			171.64
Provincia Autonoma Trento	171.66			171.66
Puglia		329.36	957.83	912.58
Sardegna	177.60	326.04	864.13	393.95
Sicilia		352.75	943.66	816.02
Toscana	172.55			172.55
Umbria	171.80	192.50		172.73
Valle d'Aosta/Vallée d'Aoste	171.56			171.56
Veneto	172.86			172.86
Total	172.32	272.41	921.58	320.85

Counterfactuals - Intensive Margin (2007 period)

	Classification of Eligibility			
	More Developed	Transition	Less Developed	Total
NUTS2 Name				
Calabria		915.26	1563.61	1561.01
		(8.73)	(148.69)	(153.94)
Campania		736.61	1272.94	1095.41
		(26.77)	(119.63)	(271.23)
Emilia-Romagna	216.41			216.41
	(36.97)			(36.97)
Lazio	214.37			214.37
	(34.61)			(34.61)
Lombardia	211.74			211.74
	(30.53)			(30.53)
Piemonte	259.24			259.24
	(59.39)			(59.39)
Puglia		543.73	1207.42	1098.57
		(14.82)	(131.22)	(273.64)
Sicilia		705.32	1303.09	1223.58
		(23.86)	(125.35)	(234.39)
Toscana	280.22			280.22
	(56.83)			(56.83)
Veneto	257.03			257.03
	(57.79)			(57.79)
Total	239.84	681.10	1350.39	641.76
	(54.58)	(86.85)	(194.87)	(530.31)

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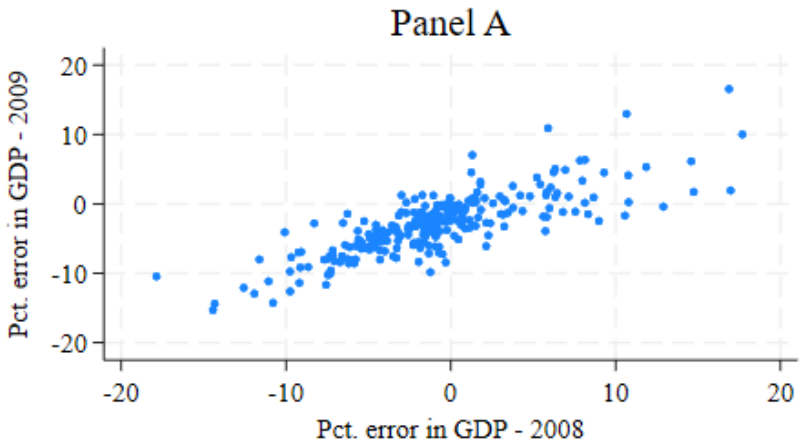
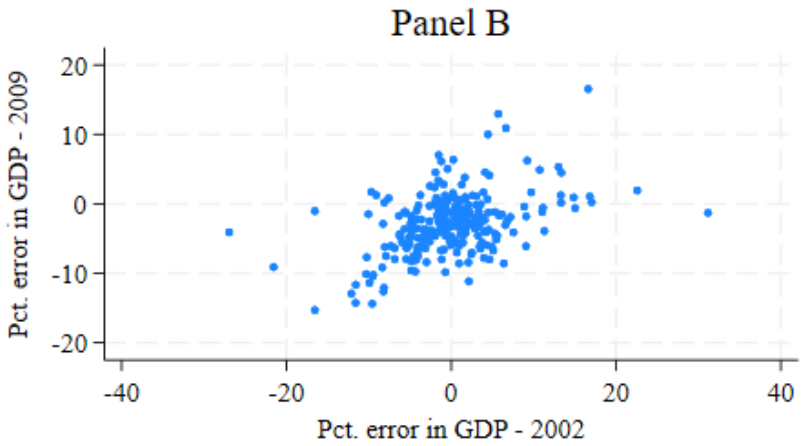
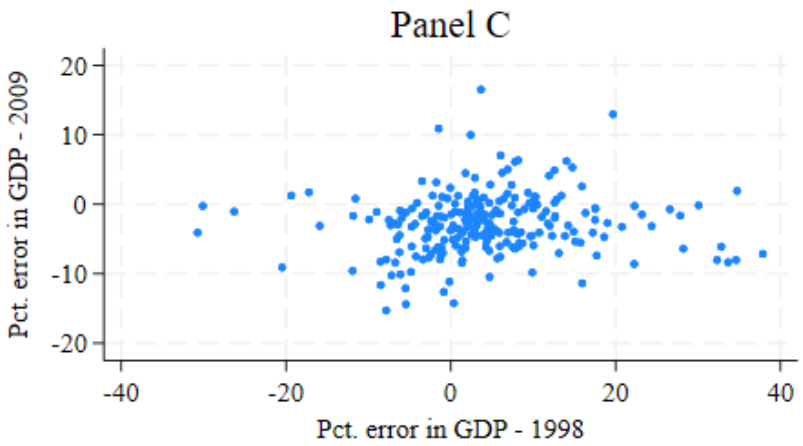
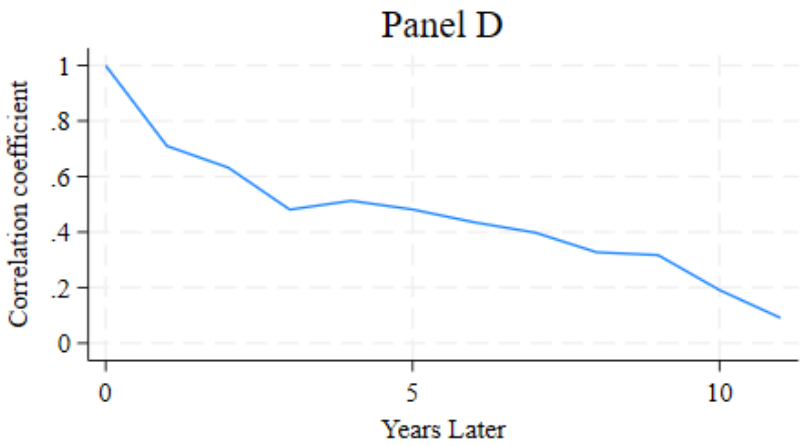
ME Seems to follow AR(1) Process









Dealing with Serial Autocorrelation

1. Estimate the following regression:

$$\%Error_{GDP,rt} = \gamma_0 + \gamma_1 \%Error_{GDP,r,t-1} + u_{rt}$$

2. Assume initial condition in 1998 - earliest year historical data is available in most cases - is fixed
3. Over subsequent years, simulate alternative walks of measurement error

$$\widetilde{\%Error}_{GDP,rt} = \hat{\gamma}_0 + \hat{\gamma}_1 \widetilde{\%Error}_{GDP,r,t-1} + \widetilde{u}_{rt}$$

Drawing the CF $\widetilde{u}_{rt}$ from the distribution of the $\hat{u}_{rt}$

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Dealing with Serial Autocorrelation

Table: Serial Correlation in Regional GDP Estimates

Panel A: Regional GDP

	(1)
	% Error, GDP
Lag % Error, GDP	0.738***
	(0.0108)
Observations	2764
Adjusted R^2	0.629

Panel B: Regional GDP per Capita

	(1)
	% Error, GDP/cap
% Error, GDP	0.864***
	(0.00780)
Lagged % Error, GDP/cap	0.148***

Moving to GDP per Capita

- Expect % error in GDP and GDP per cap are highly correlated
- To account for this, the specification used for GDP/capita is:

$$\%Error_{GDPpc,rt} = \lambda_0 + \lambda_1 \%Error_{GDP,rt} + \lambda_2 \%Error_{GDPpc,r,t-1} + v_{rt}$$

Table: AR(1) Regression of the Percent Error in Regional GDP Per Capita

	(1) % Error, GDP/cap
% Error, GDP	0.864***
	(0.00780)
Lagged % Error, GDP/cap	0.148***
	(0.00719)
Observations	2764
Adjusted R^2	0.932

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Testing Measurement Error Exogeneity

- ID strategy depends on finding an exogenous shock to construct counterfactual treatments
- Potential violations:
  1. Systematically worse in some countries (cooking the books...)
  2. Depends on other observable characteristics in a way that also determines funding levels (i.e. worse in poorer countries)

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There are some systematic differences...

	(1) % Error, GDP	(2) % Error, GDP/cap
Lag % Error, GDP	0.719***	
	(0.0147)	
Revised GDP (millions)	-0.0173**	
	(0.00782)	
% Error, GDP		0.925***
		(0.00739)
Lagged % Error, GDP/cap		0.109***
		(0.00699)
Revised GDP/cap (thous.)		0.815
		(2.664)
N. Early Leavers 18-24 (thous.)	-0.0239**	0.0112***
	(0.00942)	(0.00321)
N. Tertiary Ed. 30-34 (thous.)	0.000739	0.00469**
	(0.00619)	(0.00211)
N. Employed 15-74 (thous.)	-0.00112	-0.000132
	(0.00143)	(0.000486)
N. Unemp. 15-74 (thous.)	0.00229	-0.00283***
	(0.00275)	(0.000938)
Population (thous.)	0.000584	0.000117
	(0.000547)	(0.000186)
Low Educ. Emps. (thous.)	0.00442***	-0.00234***
	(0.00165)	(0.000561)
Austria	0	0
	(.)	(.)
Belgium	0.0312	0.217
	(0.586)	(0.199)
Bulgaria	-0.435	-0.821***
	(0.818)	(0.279)
Cyprus	-2.683**	-0.483
	(1.264)	(0.430)
Czech Republic	-0.934	0.231
	(0.670)	(0.228)
Estonia	-0.381	0.551
	(1.273)	(0.433)
Finland	-0.686	0.289
	(1.127)	(0.383)
France	0.482	0.516***
	(0.571)	(0.195)
Germany	0.699	-0.725***
	(0.524)	(0.178)
Greece	-0.323	0.396**
	(0.573)	(0.195)
Hungary	0.275	0.0378
	(0.694)	(0.236)
Italy	-1.216**	-0.287
	(0.597)	(0.203)
Latvia	0.101	-2.487***
	(1.437)	(0.489)
Luxembourg	0.582	0.396
	(1.265)	(0.430)
Malta	-1.779	0.155
	(1.394)	(0.474)
Netherlands	-0.229	0.242
	(0.566)	(0.193)
Poland	0.131	0.327
	(0.705)	(0.240)
Portugal	-2.871***	1.528***
	(0.912)	(0.310)
Romania	-0.964	-2.365***
	(0.778)	(0.265)
Slovakia	0.0206	0.146
	(0.841)	(0.286)
Spain	0.493	1.336***
	(0.606)	(0.206)
Sweden	-0.821	0.363*
	(0.642)	(0.218)
United Kingdom	0.548	0.101
	(0.521)	(0.177)
Observations	2001	2001
Adjusted R^2	0.646	0.963
SD outcome	6.230	6.528

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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...but in practice unimportant

- Some of these are statistically significant but not economically significant (i.e. revised GDP)
- Adjusted R^2 hardly increases (.629 to .646)

  $\rightarrow$ distribution of the $\hat{u}_{rt}$ hardly changes when adding the additional controls
- Coefficient on the lag also barely budges (.738 to 0.719)
- Both of these together imply that the AR(1) walk won't change much, b/c the exogenous variation is the alternative walk of the $\hat{u}_{rt}$
- We do it anyway and results are unchanged from the simpler specification

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Unable to Incorporate 3-Year Avg

- We cannot replicate the three-year-average aspect of the funding process
- This is because of lack of data - only the average for GDP/capita is reported, not GDP
- We cannot use older documents to construct the average - initial revisions will have already taken place
- Given the serial autocorrelation in the measurement errors, this is unlikely to be a major problem

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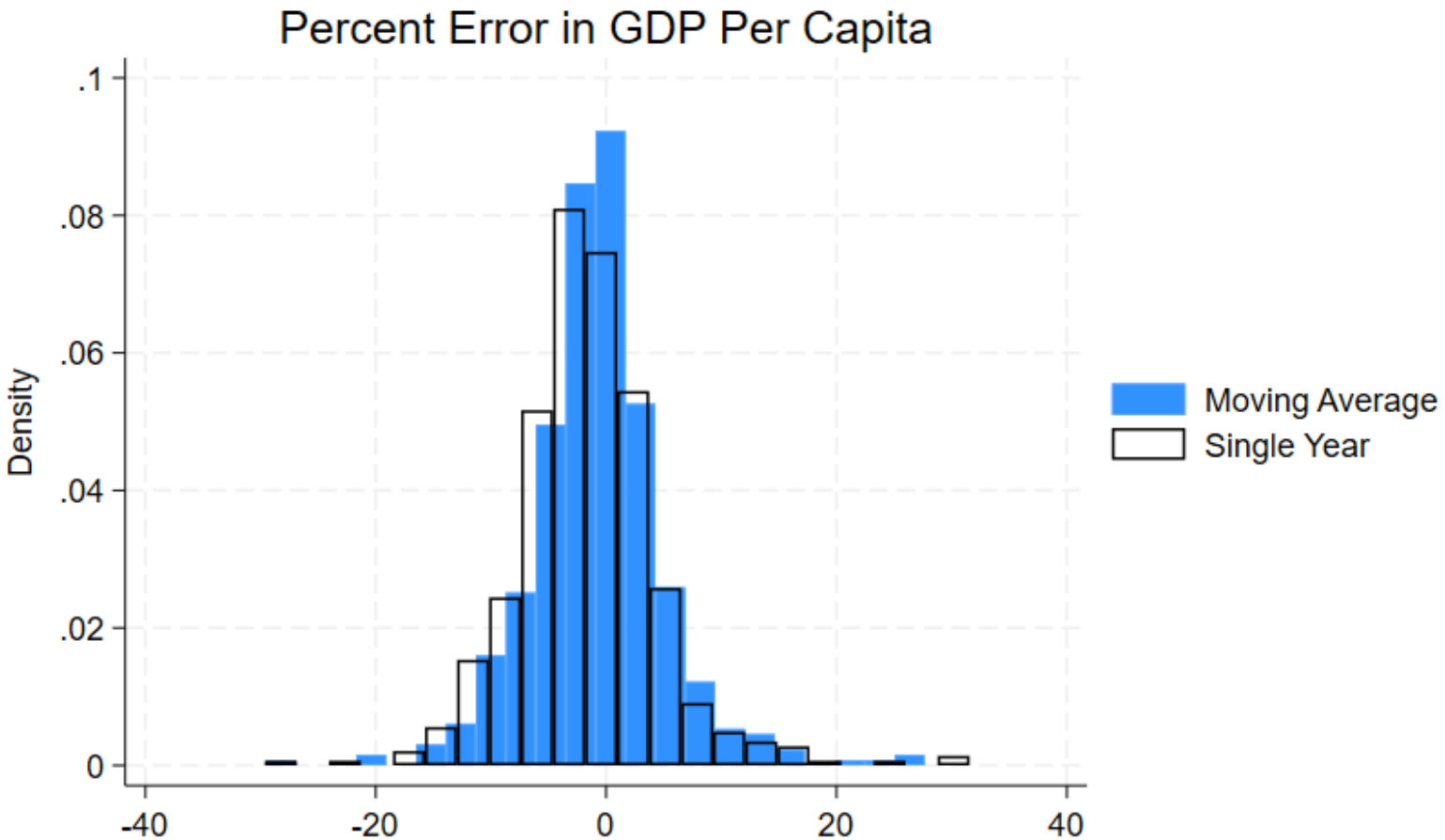
Unable to Incorporate 3-Year Avg



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Counterfactuals - Funding

	Classification of Eligibility			
	More Developed	Transition	Less Developed	Total
NUTS2 Name				
Abruzzo	313.06	311.47		313.03
Basilicata		1114.85	1101.17	1113.14
Calabria		915.26	1563.61	1561.01
Campania		736.61	1272.94	1095.41
Emilia-Romagna	216.41			216.41
Friuli-Venezia Giulia	269.50			269.50
Lazio	214.37			214.37
Liguria	286.77			286.77
Lombardia	211.74			211.74
Marche	310.91			310.91
Molise	314.09	552.40	1052.84	402.98
Piemonte	259.24			259.24
Provincia Autonoma Bolzano/Bozen	211.54			211.54
Provincia Autonoma Trento	212.55			212.55
Puglia		543.73	1207.42	1098.57
Sardegna		880.29	1161.81	954.33
Sicilia		705.32	1303.09	1223.58
Toscana	280.22			280.22
Umbria	311.22			311.22
Valle d'Aosta/Vallée d'Aoste	211.54			211.54
Veneto	257.03			257.03
Total	257.43	870.48	1326.71	524.53

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Negative Labor Reallocation, Positive Entry Effects

Table: Decomposition of Aggregate Productivity Growth Effects

	(1) $\Delta\Phi$	(2) $\Delta\overline{\phi}$	(3) Δcov	(4) Entry	(5) Exit
Log(Payments)	-0.0290	0.0107	-0.0636***	0.0321**	-0.00830
	(0.0210)	(0.0152)	(0.0174)	(0.0116)	(0.00815)
Log(E(Payments))	0.0414	0.000150	0.0694***	-0.0341**	0.00590
	(0.0297)	(0.0177)	(0.0215)	(0.0136)	(0.00883)
Observations	1040	1040	1040	1040	1040

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Alternative CF Generation Results Unchanged

Table: Dynamic Olley-Pakes Decomposition - Alternative CF Funding Construction

	(1) $\Delta\Phi$	(2) $\Delta\overline{\phi}$	(3) Δcov	(4) Entry	(5) Exit
Log(Payments)	-0.0711**	-0.0112	-0.0688***	0.0239*	-0.0150
	(0.0300)	(0.0158)	(0.0193)	(0.0116)	(0.0102)
Log(E(Payments))	0.0509	0.00651	0.0680***	-0.0369*	0.0134
	(0.0430)	(0.0188)	(0.0227)	(0.0181)	(0.0119)
Observations	1040	1040	1040	1040	1040

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Negative or Null Aggregate Productivity Effects

Table: Effects of Cohesion Policy on Aggregate Productivity Growth

	(1) $\Delta\Phi$	(2) $\Delta\Phi$	(3) $\Delta\Phi$	(4) $\Delta\Phi$
Log(Payments)	-0.0688**	-0.0710**	-0.0245	-0.0290
	(0.0279)	(0.0308)	(0.0184)	(0.0210)
Log(E(Payments))	0.0339	0.0500	0.0315	0.0414
	(0.0351)	(0.0433)	(0.0256)	(0.0297)
Observations	1040	1040	1040	1040
Demo. Controls	No	No	Yes	Yes
Other EU Payments Controls	No	Yes	No	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Negative Labor Reallocation, Manufacturing

Table: Regional Productivity Changes - Manufacturing Sector

	(1) $\Delta\Phi$	(2) $\Delta\overline{\phi}$	(3) Δcov	(4) Entry	(5) Exit
Log(Payments)	-0.0643**	0.00602	-0.0631**	-0.00464	-0.00259
	(0.0292)	(0.0116)	(0.0280)	(0.0101)	(0.00955)
Log(E(Payments))	0.0635*	-0.0106	0.0674**	0.000679	0.00611
	(0.0328)	(0.0112)	(0.0286)	(0.0104)	(0.0126)
Observations	831	831	831	831	831

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Negative Labor Reallocation, Services

Table: Regional Productivity Changes - Services Sector

	(1) $\Delta\Phi$	(2) $\Delta\overline{\phi}$	(3) Δcov	(4) Entry	(5) Exit
Log(Payments)	0.0117	0.0116	-0.0219	0.0396**	-0.0176
	(0.0312)	(0.0156)	(0.0177)	(0.0177)	(0.0110)
Log(E(Payments))	0.0232	0.00451	0.0421	-0.0334*	0.00995
	(0.0410)	(0.0197)	(0.0281)	(0.0172)	(0.0133)
Observations	888	888	888	888	888

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Table: Heterogeneity: Funding Absorption

Panel A: Reallocation Effect

	(1) Δcov	(2) Δcov	(3) Δcov
Log(Payments)	-0.0610***	-0.0652***	-0.0330
	(0.0163)	(0.0186)	(0.0306)
Payments x MoreDev	0.0122**		
	(0.00566)		
Log(E(Payments))	0.0586***	0.0702***	0.0341
	(0.0205)	(0.0227)	(0.0328)
Observations	1040	911	627
Excluding Sicily	No	Yes	No
Commitment Condition	No	No	Yes

Panel B: Entry Effect

	(1) Entry	(2) Entry	(3) Entry
Log(Payments)	0.0296**	0.0371***	0.00362
	(0.0113)	(0.0124)	(0.0204)
Payments x MoreDev	-0.00786**		
	(0.00347)		
Log(E(Payments))	-0.0253*	-0.0383**	-0.00125
	(0.0139)	(0.0147)	(0.0252)
Observations	1040	911	627
Excluding Sicily	No	Yes	No
Commitment Condition	No	No	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Splitting by Funding Period

Table: Splitting by Funding Period

Panel A: 2007-2013 Period

	(1) Δcov	(2) Entry
Log(Payments)	-0.0457**	0.0238
	(0.0171)	(0.0163)
Log(E(Payments))	0.0553**	-0.0150
	(0.0254)	(0.0211)
Observations	506	506

Panel B: 2014-2020 Period

	(1) Δcov	(2) Entry
Log(Payments)	-0.0935***	0.0395***
	(0.0242)	(0.0102)
Log(E(Payments))	0.0959***	-0.0435***
	(0.0272)	(0.00980)
Observations	534	534

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Longer Time Span

Table: Alternative Time Span

	(1) $\Delta\,\Phi$	(2) $\Delta\,\overline{\Phi}$	(3) $\Delta\,cov$	(4) Entry	(5) Exit
Log(Payments)	-0.0288	-0.00140	-0.0303*	0.0279**	-0.0250*
	(0.0284)	(0.0159)	(0.0146)	(0.0101)	(0.0140)
Log(E(Payments))	0.0341	0.0196	-0.00510	-0.0102	0.0298*
	(0.0333)	(0.0196)	(0.0233)	(0.0139)	(0.0161)
Observations	506	506	506	506	506

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Absolute Funding Levels

Table: Dynamic Olley-Pakes Decomposition of Regional Productivity Changes due to EU Cohesion Policy

	(1) $\Delta\Phi$	(2) $\Delta\overline{\phi}$	(3) Δcov	(4) Entry	(5) Exit
Log(Payments)	-0.00862	0.0154	-0.0423*	0.0221*	-0.00375
	(0.0282)	(0.0135)	(0.0244)	(0.0109)	(0.0146)
Log(E(Payments))	0.0288	-0.00990	0.0617**	-0.0322***	0.00920
	(0.0302)	(0.0136)	(0.0238)	(0.0107)	(0.0139)
Observations	1063	1063	1063	1063	1063

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Entry Effects, Construction

Table: Regional Productivity Changes - Construction Sector

	(1) $\Delta\Phi$	(2) $\Delta\overline{\phi}$	(3) Δcov	(4) Entry	(5) Exit
Log(Payments)	0.0774***	0.0701**	-0.0119	0.0291***	-0.00994*
	(0.0212)	(0.0318)	(0.0241)	(0.00968)	(0.00509)
Log(E(Payments))	-0.0816***	-0.0454	-0.0140	-0.0337**	0.0115**
	(0.0263)	(0.0375)	(0.0346)	(0.0125)	(0.00526)
Observations	816	816	816	816	816

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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No Effects on LFPR

Table: LFPR Response to EU Cohesion Policy

	(1) $\Delta LFPR$	(2) $\Delta LFPR$	(3) $\Delta LFPR$	(4) $\Delta LFPR$	(5) $\Delta LFPR$
Log(Payments)	-0.0494	-0.200	-0.385	-0.375	-0.417
	(0.224)	(0.207)	(0.258)	(0.268)	(0.267)
Log(E(Payments))	-0.109	0.0848	0.275	0.234	0.321
	(0.258)	(0.264)	(0.353)	(0.360)	(0.366)
Observations	1040	1040	1040	1040	1040
Demo. Controls	No	No	Yes	Yes	Yes
Other EU Payments Controls	No	Yes	No	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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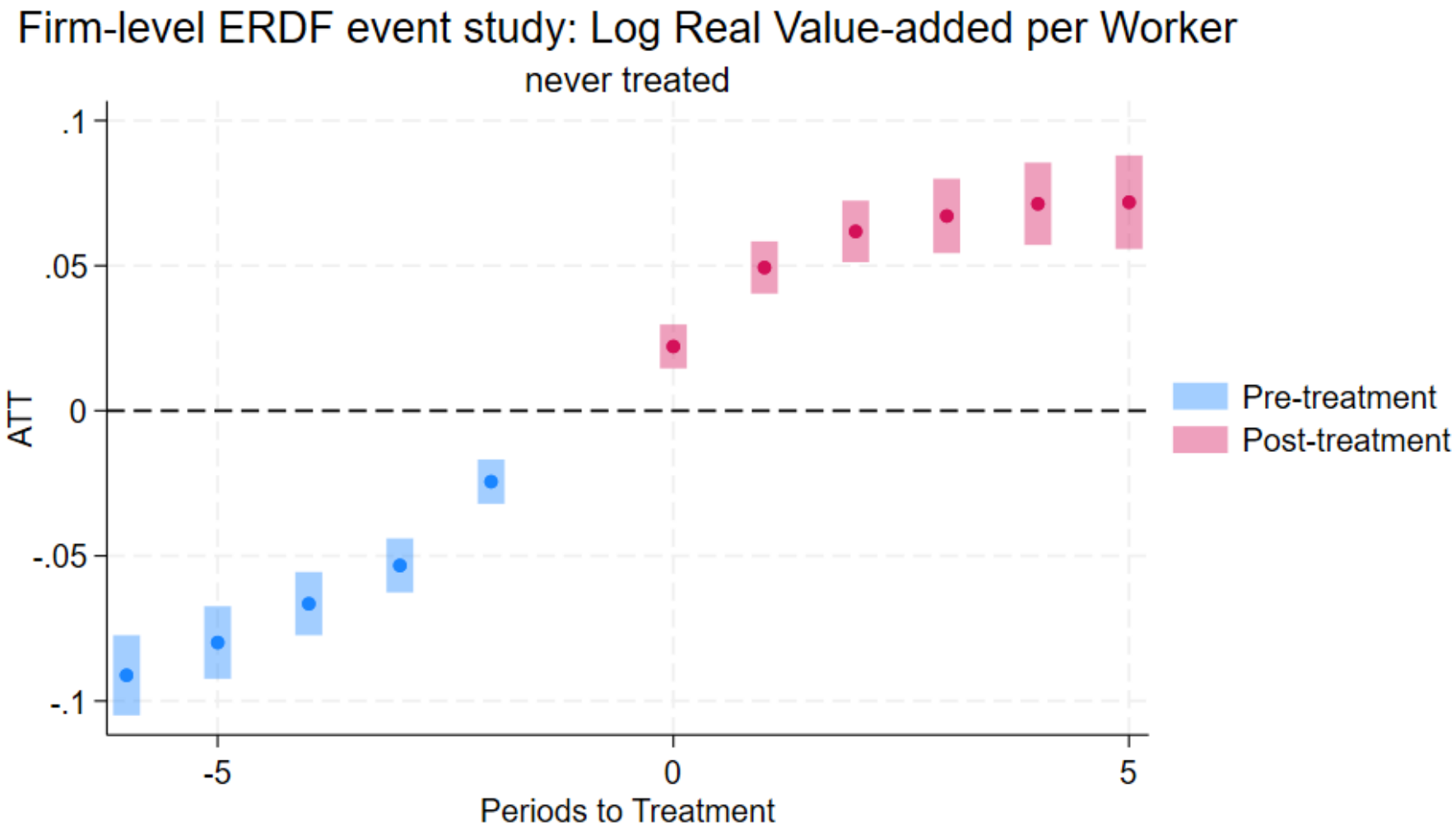
Positive Selection Into Funds



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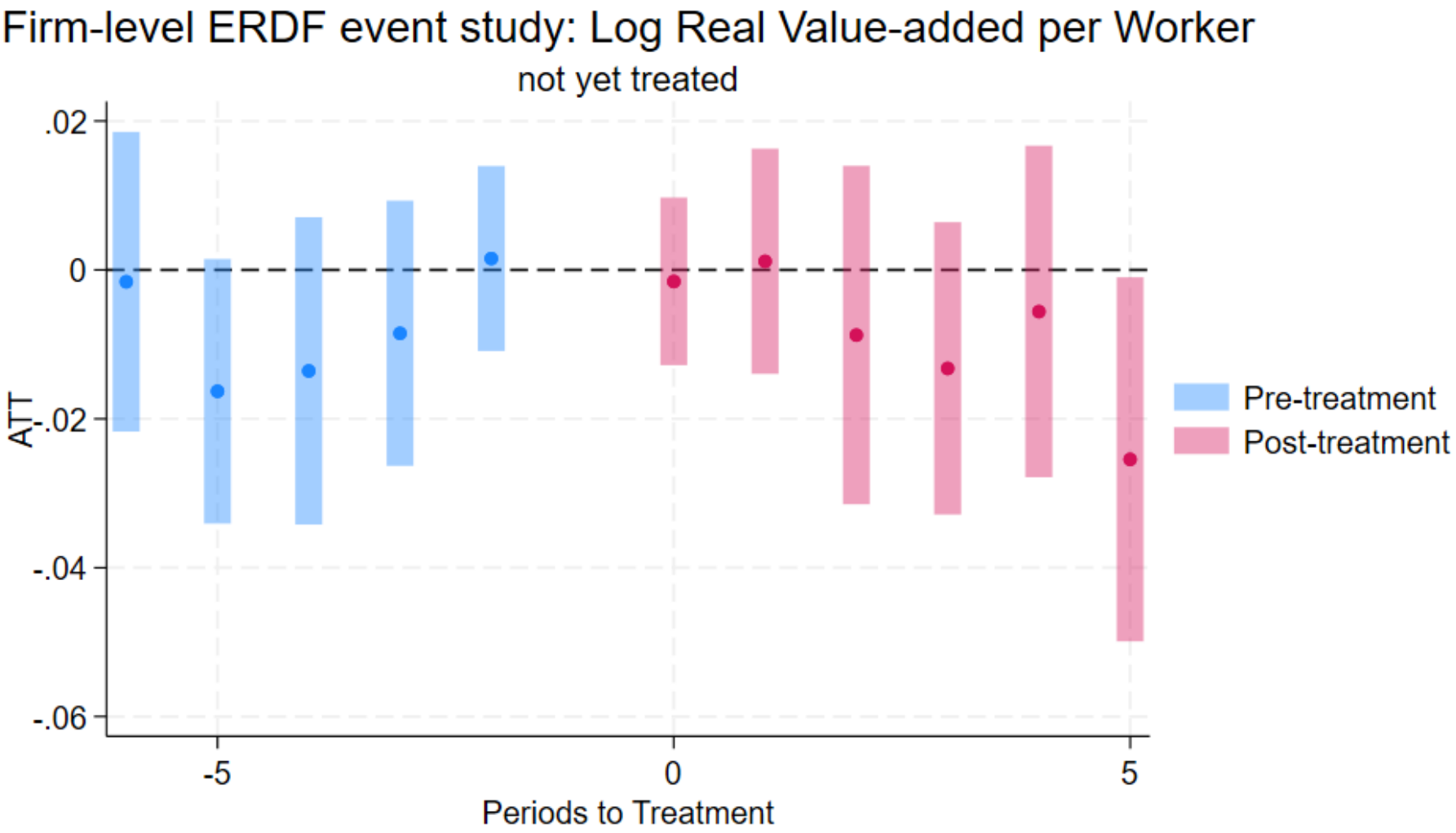
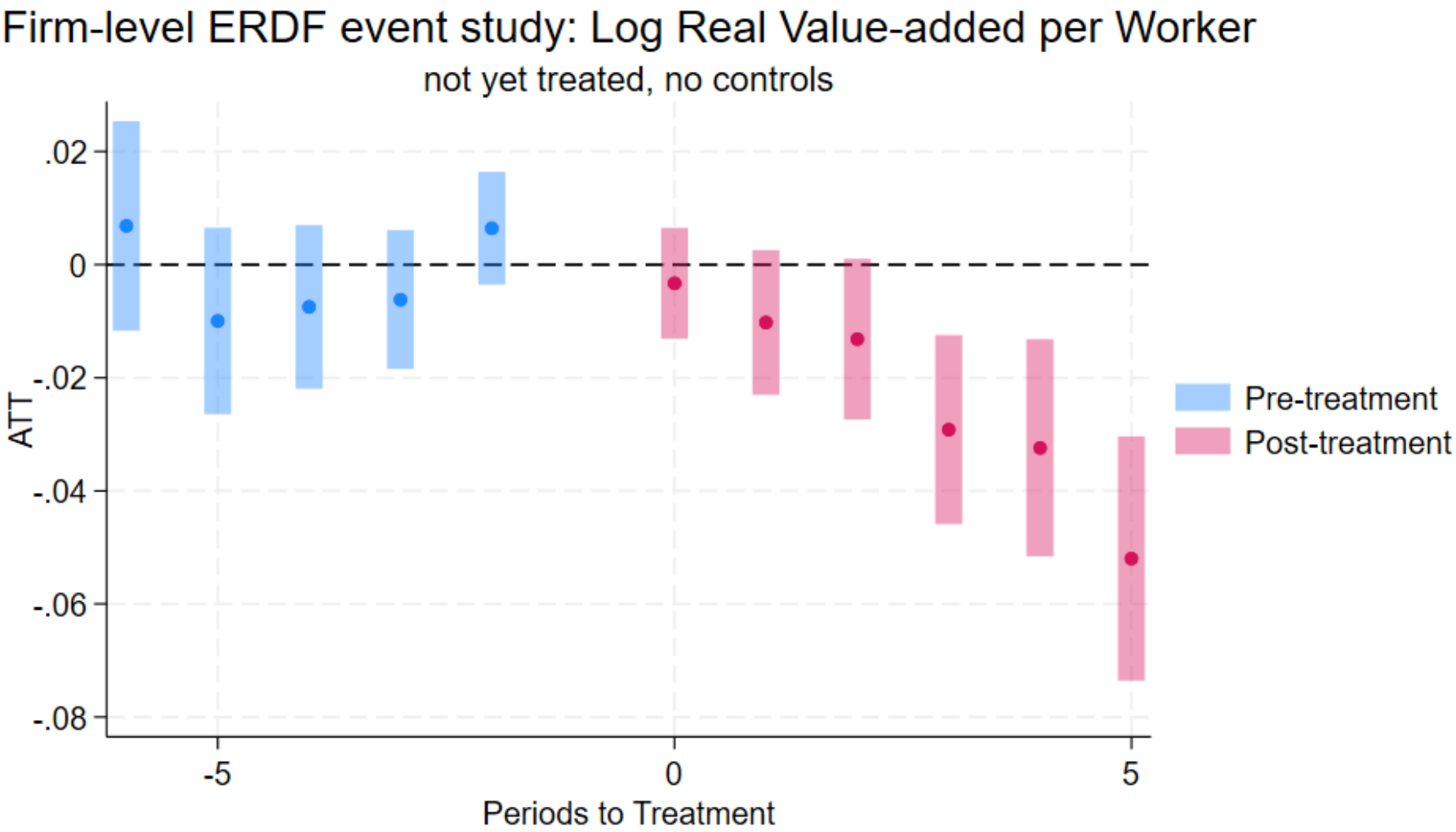
Nothing for Productivity



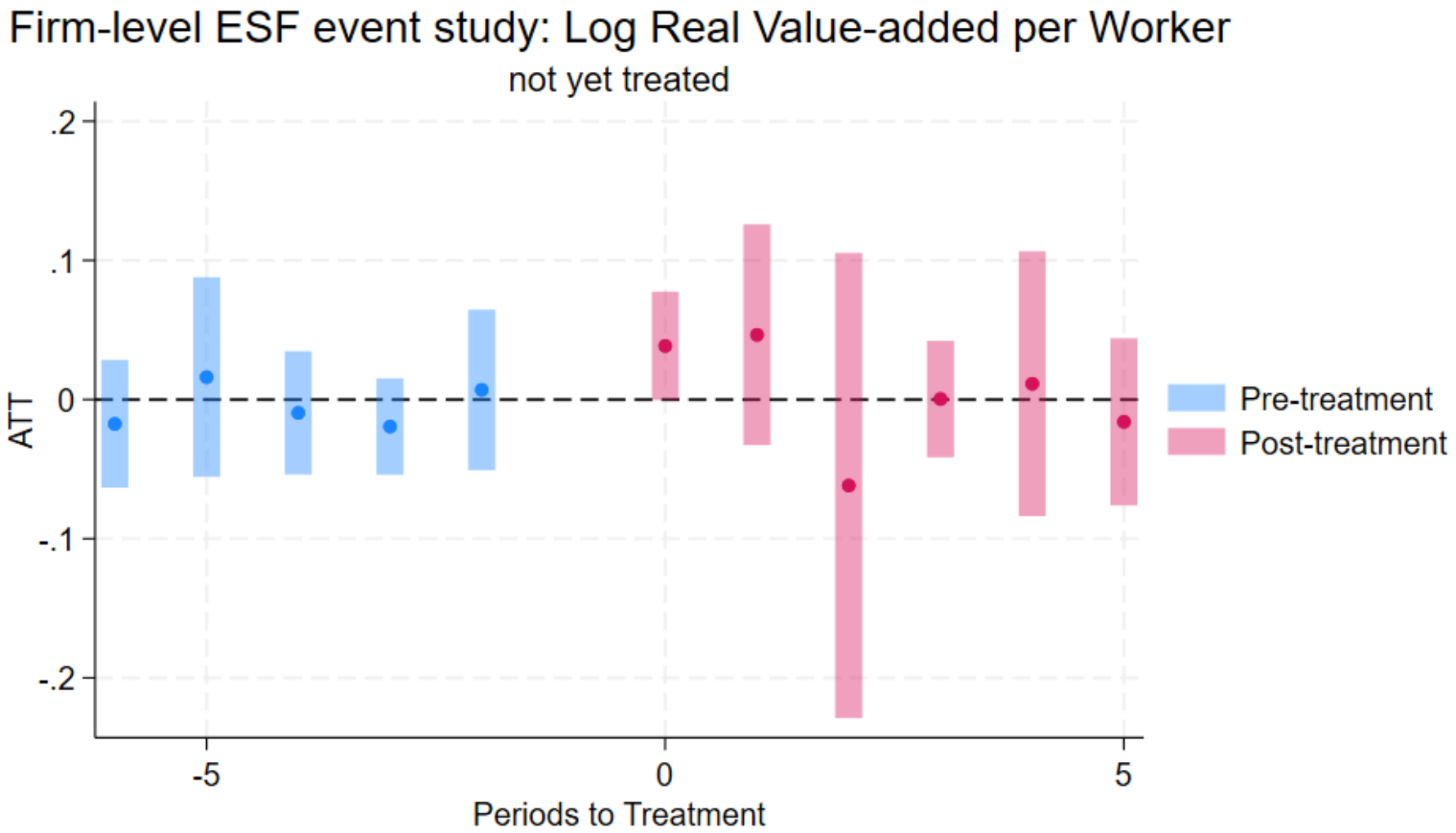
▸ No Controls ▸ Never Treated ▸ ESF ▸ Back

Controls Matter for Productivity FX



Back

ESF - Also No FX



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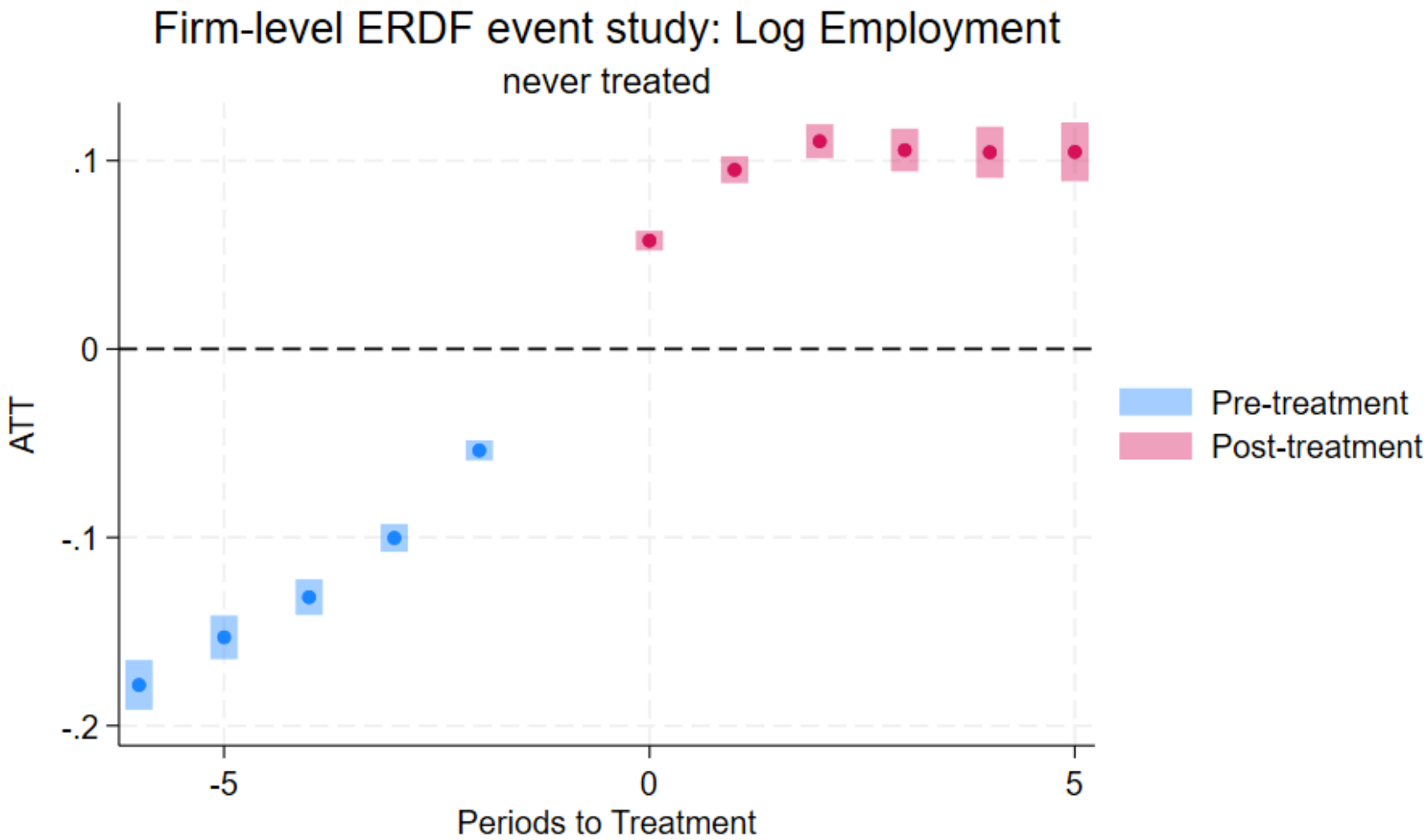
Positive Selection Into Funds



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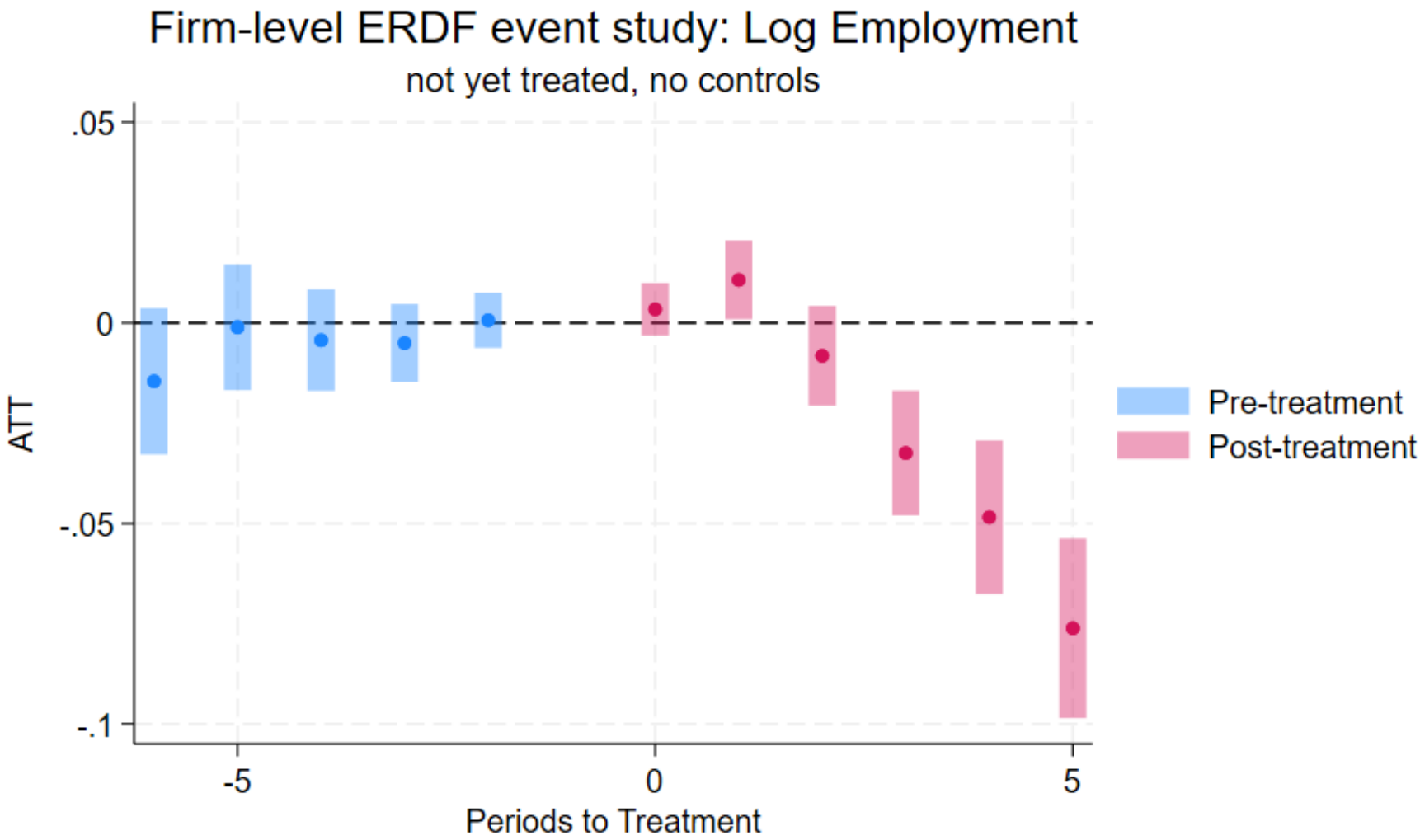
Controls Don't Matter for Employment FX



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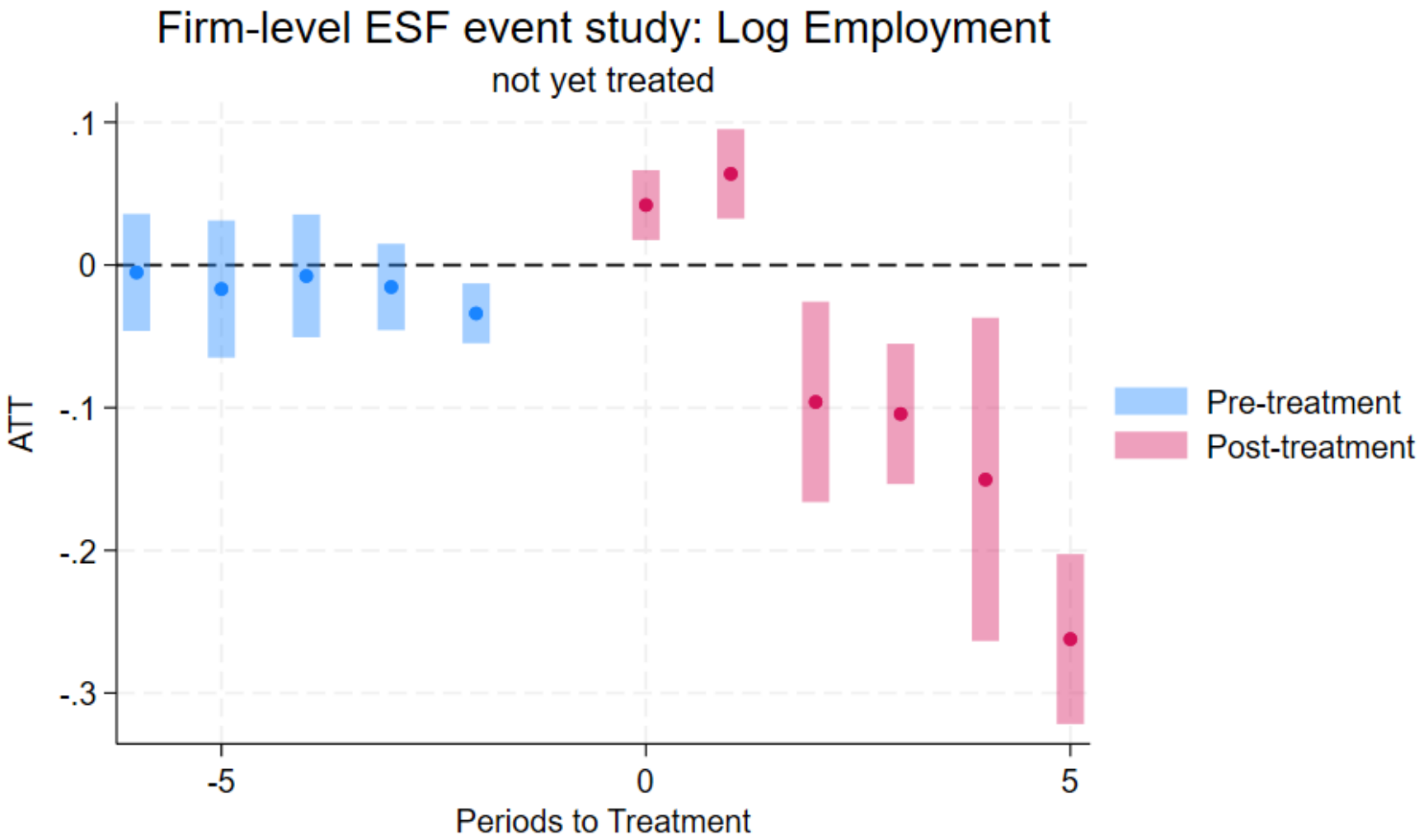
Hiring Projects Have Short-Run FX



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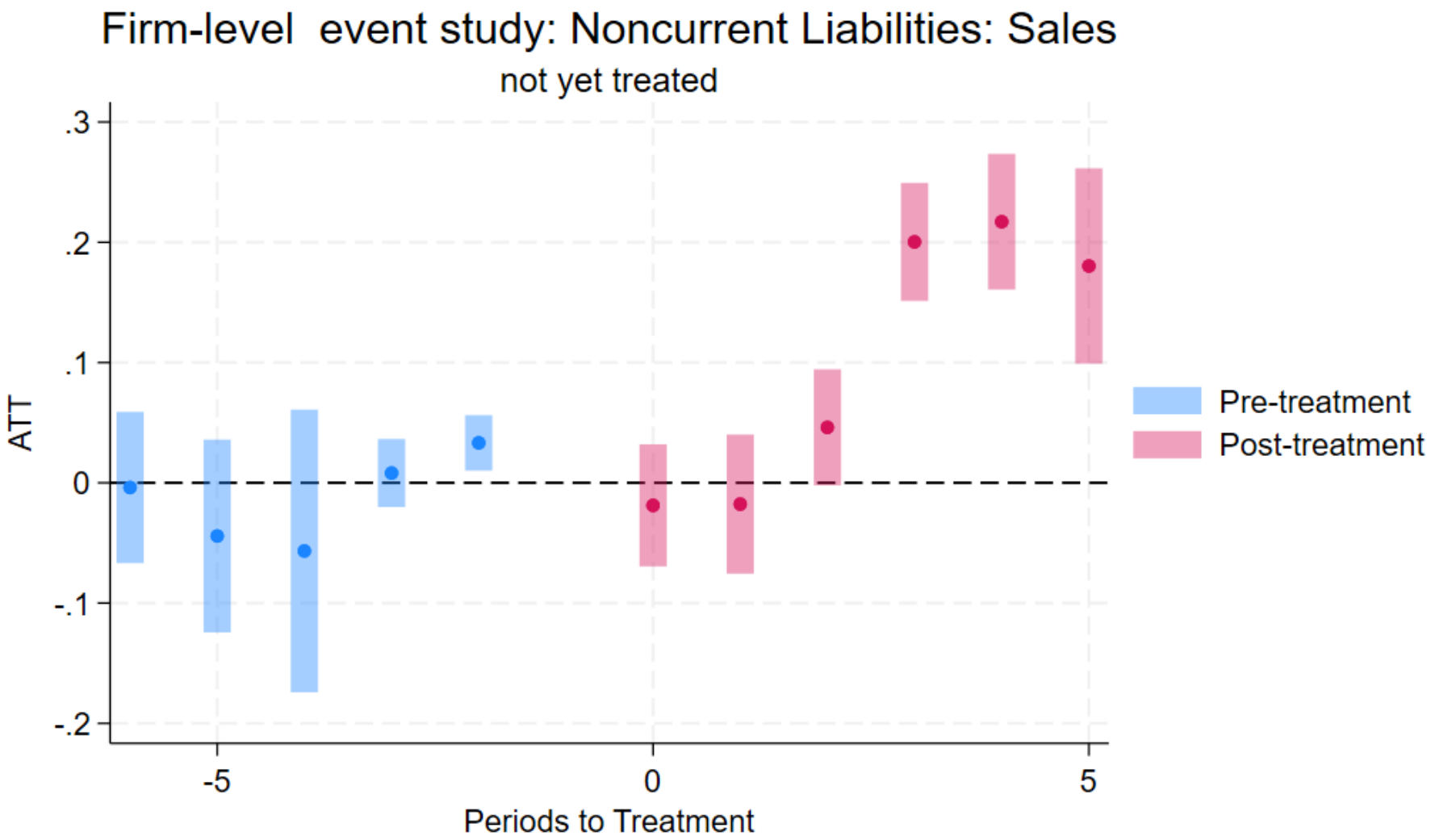
Liquidity Constraints: ESF



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